



# **Final Supplemental Environmental Assessment**

## **VTRS Fiber Optic Cable Installation on South Base**

### **Vandenberg Air Force Base California**

**8 November 2007**

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## **FINAL**

### **FINDING OF NO SIGNIFICANT IMPACT**

#### **VTRS Fiber Optic Installation on South Base**

#### **Vandenberg Air Force Base, California**

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 U.S. Code 4321 *et seq.*, implementing Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR Part 989, *Environmental Impact Analysis Process*, the U.S. Air Force (Air Force) conducted an assessment of the potential environmental consequences associated with the realignment of 2.9 miles of the VTRS Fiber Cable Installation route on South Vandenberg Air Force Base (AFB), California.

Vandenberg AFB is headquarters to the 30th Space Wing (30 SW), the Air Force Space Command unit that operates Vandenberg AFB and the Western Range. Vandenberg AFB operates as a missile test base and aerospace center, supporting west coast space launch activities for the Air Force, Department of Defense, National Aeronautics and Space Administration, and commercial contractors.

Vandenberg AFB is located on the south-central coast of California, approximately halfway between San Diego and San Francisco. The 99,000-acre base extends along approximately 35 miles of the Santa Barbara County coastline.

Vandenberg AFB is in the process of installing a basewide fiber optic network, commonly referred to as CITS (Combat Information Transport System). As described in the *Final Environmental Assessment for the Combat Information Transport System Upgrade* (CITS EA; USAF 2006), the VTRS fiber optic cable installation, described in the *Final Environmental Assessment for VTRS Fiber Optic Cable Installation on South Base* (VTRS EA; USAF 2004), is part of the CITS project.

The Air Force considers CITS to be part of the national defense system by establishing critical communication sustainability for air and space programs at Vandenberg AFB. CITS will integrate existing data systems and provide the capability to integrate these systems with planned voice, video, imagery, and sensor systems. During the course of installing the VTRS segments, environmental conditions (erosion and steepness of terrain) in a portion of the route precluded the feasibility of using the pre-selected alignment. As a result, a 3.7-mile portion of the VTRS fiber optic cable route was identified as needing to be realigned to meet the requirements of the CITS project. The proposed realignment route is 2.9 miles long.

The Supplemental Environmental Assessment (EA), incorporated by reference in this finding, is a supplement to the VTRS EA and expands the scope of previous analyses to include a new 2.9-mile portion on south Vandenberg AFB, and is intended to analyze the effects of the realignment of this portion of the VTRS route on the natural and human environments. The Supplemental EA considers all identified potential impacts of the Proposed Action and No-Action Alternative, both as a solitary action and cumulatively in conjunction with other projects at Vandenberg AFB, and provides guidelines for the proposed activities to avoid adverse environmental effects.

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### **PROPOSED ACTION**

The VTRS EA (USAF 2004) proposed installing approximately 11 miles of subsurface fiber optic cable on South Vandenberg AFB. As described in the CITS EA (USAF 2006), the VTRS fiber optic cable installation is part of the overarching CITS project. During the implementation phase of CITS, a need to realign the selected route was identified due to environmental conditions (erosion and steepness of terrain) observed in a portion of the VTRS route (Segments 4 through 8). A new route was identified to replace 3.7 miles of VTRS segments. The proposed 2.9-mile realignment route would span from Honda Ridge Road east of Tranquillon Mountain and continue southeast for about 1,935 feet and then south for about 5,875 feet along the top and side of a ridge, on existing roads. It would then cross westward through open space over that ridge, and north up the crest of the next ridge east on an existing road. The new segment would terminate at the beginning of the existing VTRS Segment 9. Two manholes would be installed along this proposed realignment. The proposed realignment would be installed along existing unpaved roads/established trails, with the exception of approximately 3,200 feet, which would be installed in open space.

The installation consists of the subsurface placement of 0.75-inch cables inside tubular conduits ranging in size from 1.25 inches to four inches in diameter. Fiber optic lines would be installed by plowing or boring the lines depending on the topography and presence of sensitive resources. Installation would occur over approximately four weeks in October/November 2007 (weather permitting, but no later than June 2008).

All construction areas would be backfilled to grade and returned to a like condition. Soil stockpiled during excavation activities would be either used as backfill, used at another project if accepted by that project's contractor, used at the Vandenberg AFB landfill if the capacity for daily cover material is available, disposed of in an on-base borrow pit if approved by the 30th Civil Engineer Squadron, or transported to an appropriate disposal facility off Vandenberg AFB.

Implementation of the No-Action Alternative would result in not realigning the VTRS route. Because the original route for VTRS segments 4 through 8 is not feasible, without this realignment of the VTRS fiber optic cable, the CITS upgrade would not be completed. As previously discussed in the VTRS EA (USAF 2004) and the CITS EA (USAF 2006), incorporated by reference, reliability would be compromised and additional facilities would remain unconnected to the system and therefore lack integrated high bandwidth networking options. CITS is considered a part of the national defense system by the Air Force, and this system would not be operating at its full potential.

### **SUMMARY OF FINDINGS**

The following resource areas were considered but not analyzed in this Supplemental EA because the magnitude of the Proposed Action is similar to that represented by the VTRS segments being realigned, and the potential impacts associated with the new realignment route would be similar to those of the segments eliminated and which were analyzed in the VTRS EA (USAF 2004): Air Quality, Earth Resources, Environmental Justice, Hazardous Materials and Hazardous Waste Management, Human Health and Safety, Land Use, Noise, Pollution Prevention, and Socioeconomics. In addition, no Installation Restoration Program sites, Areas of Concern or Areas of Interest are present within the proposed VTRS realignment route, thus there are no potential risks to workers. Transportation is not analyzed in the supplemental EA because the location of the Proposed Action would not affect local or regional transportation and traffic.



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The analyses of the affected environment and environmental consequences of implementing the Proposed Action presented in the Supplemental EA concluded that with implementation of the protection measures as described in Section 2.1.5, no significant effects should result to Biological Resources (Section 4.1), and Water Resources (Section 4.3).

No cumulative adverse impacts will result from activities associated with the upgrade of the CITS, when considered in conjunction with recent past and future projects within the project area (Section 4.4).

One area of environmental consequences evaluated in the EA was determined to have the potential to result in less than significant impacts to the environment.

### **Cultural Resources**

Five of sixteen previously recorded sites located within 0.25 mile of the proposed VTRS realignment route and associated access roads are on or adjacent to some portion of the project. In two of these cases the route is close to the sites, but is also separated vertically from the site boundary by steep slopes. Activities associated with fiber optic cable installation would not affect any of the sites. Four of the sites are located on access roads. For three of the sites vehicle traffic would be restricted to the existing road where no cultural material was found. One site has midden material in the road; this site would be avoided by bringing equipment through Honda Ridge Road. No off-road travel or equipment staging would be permitted within the boundaries of known archaeological sites. These measures should prevent project activities from affecting known cultural resources.

## **FINDING OF NO SIGNIFICANT IMPACT**


Based upon our review of the facts and analyses contained in the attached EA, conducted in accordance with the provisions of NEPA, the CEQ Regulations, and 32 CFR Part 989, we conclude that the Proposed Action should not have a significant environmental impact, either by itself or cumulatively with other projects at Vandenberg AFB. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.



**FINDING OF NO SIGNIFICANT IMPACT  
CONCURRENCE PAGE**


Supplemental Environmental Assessment  
*VTRS Fiber Optic Cable Installation on South Base, Vandenberg Air Force Base,  
California*

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2 Dec 07


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15 Nov 07



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**Final**  
**Supplemental Environmental Assessment**

**VTRS Fiber Optic Cable Installation on South Base**  
**Vandenberg Air Force Base**  
**California**

*Prepared for:*

Department of the Air Force  
30th Space Wing Civil Engineer Squadron Environmental Flight  
Vandenberg Air Force Base, California

8 November 2007

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## Acronyms and Abbreviations

30 CES/CEV	30th Civil Engineer Squadron, Environmental Flight
30 CES/CEVC	30th Environmental Flight, Compliance Office
30 CES/CEVNC	30th Environmental Flight, Cultural Resources Office
30 SW	30th Space Wing
30 SWP	30th Space Wing Plan
AFI	Air Force Instruction
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
Air Force	United States Air Force
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
BCC	Bird of Conservation Concern
BMP	Best Management Practice
CAA	Clean Air Act
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CITS	Combat Information Transport System
CNDDB	California Natural Diversity Data Base
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
EA	Environmental Assessment
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FE	Federally Endangered
GIS	Geographic Information System
HDD	Horizontal directional drilling
HDPE	High density polyethylene
MBTA	Migratory Bird Treaty Act
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA Fisheries Service	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

OSHA	Occupational Safety and Health Act
PPA	Pollution Prevention Act
POL	Petroleum, oil and lubricants
PVC	Poly-Vinyl Chloride
RCRA	Resource Conservation and Recovery Act
RWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control Board
SBCAPCD	Santa Barbara County Air Pollution Control District
SE	State Endangered
SSC	Species of Special Concern
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TSCA	Toxic Substances Control Act
UCSB	University of California, Santa Barbara
USAF	United States Air Force
USC	United States Code
U.S. EPA	United State Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VAFB	Vandenberg Air Force Base
VTRS	Vandenberg Telemetry Relay Station
WDR	Waste Discharge Requirement

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## Chapter 1. Purpose of and Need for the Proposed Action

This Supplemental Environmental Assessment (EA) evaluates the potential environmental effects associated with the installation of 2.9 miles of subsurface fiber optic cable to service critical communication needs for facilities on south Vandenberg Air Force Base (VAFB) in Santa Barbara County, California.

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations require lead agencies to evaluate the potential impacts of federal actions on the surrounding environment. The United States Air Force (USAF or Air Force) is the lead agency for NEPA compliance on the proposed project.

This EA has been prepared in accordance with the NEPA of 1969, as amended (42 United States Code [USC] 4321 et seq.); as implemented by CEQ Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); and 32 CFR Part 989.

### 1.1 Background

In December 2004, the Air Force published an environmental assessment that assessed the potential environmental effects of replacing the existing and deteriorating critical subsurface copper wire communication line between facilities on south VAFB supporting the Vandenberg Telemetry Relay Station (VTRS), with a subsurface, fiber optic cable system (*Final Environmental Assessment for VTRS Fiber Optic Cable Installation on South Base* [VTRS EA; USAF 2004]). Implementation of this project was initiated in August 2006 as part of a basewide effort to install and upgrade critical subsurface fiber optic cable, as described and analyzed in the *Final Environmental Assessment for the Combat Information Transport System (CITS) Upgrade* (CITS EA; USAF 2006).

### 1.2 Need

During the course of implementing the actions described in the VTRS EA (USAF 2004) and the CITS EA (USAF 2006), environmental conditions (erosion and steepness of terrain) in a portion of the VTRS EA (USAF 2004) fiber optic cable route preclude the feasibility of using the pre-selected alignment. As a result, this portion of the VTRS fiber optic cable route was identified as needing to be realigned to meet the requirements of the CITS project.

### 1.3 Purpose

The basewide fiber optic network being installed at VAFB, of which the VTRS is part, is commonly referred to as CITS. When completed, CITS will provide an integrated, high bandwidth network solution, consisting of network equipment and fiber optic cable connectivity. It will augment existing distribution infrastructures and deliver a high speed, broadband, robust digital information transport system. CITS will integrate existing data systems and provide the capability to integrate these systems with planned voice, video, imagery, and sensor systems, including classified systems. In addition, CITS will improve reliability via dual connectivity and eliminate existing network maintenance issues. The Air Force considers CITS to be part of the national defense system by establishing critical communication sustainability for air and space programs at VAFB.

### 1.4 Project Location

VAFB is headquarters for the 30th Space Wing (30 SW). The Air Force's primary

missions at VAFB are to launch and track satellites in space, test and evaluate America's intercontinental ballistic missile systems, and support aircraft operations in the Western Range. As a non-military facet of operations, VAFB is also committed to promoting commercial space launch ventures.

VAFB is located on the south-central coast of California, approximately halfway between San Diego and San Francisco (Figure 1-1). The base occupies approximately 99,099 acres in western Santa Barbara County (USAF 2005) and occurs in a transitional ecological region that includes the northern and southern distributional limits for many plant and animal species. The Santa Ynez River and State Highway 246 divide VAFB into two distinct parts – North Base and South Base.

The Proposed Action would include installing approximately 2.9 miles of fiber optic cable on south VAFB and abandoning the proposed installation of VTRS Segments 4 through 8 (see Figure 2-1 in Chapter 2). Typically, fiber optic cable and infrastructure is installed subsurface along paved roads, unpaved or gravel roads, dirt access roads, and established trails. The proposed realignment of the VTRS route would be installed on existing unpaved roads and established trails, with the exception of a small portion (approximately 3,200 feet) which would be installed in open space (see Figure 2-2 in Chapter 2).

## 1.5 Use of Tiering

This EA is tiered under other currently existing NEPA documents. This assessment is intended to supplement and update the previous NEPA evaluation of implementing the VTRS fiber optic cable upgrade on south VAFB (USAF 2004). A detailed review of the VTRS EA (USAF 2004) for its continued applicability of the environmental effects analysis concluded that no new information of changed circumstances exists that would cause a reevaluation of the effects analyses in that document, other than the new

realignment route, and which is analyzed in this Supplemental EA.

## 1.6 Scope of the Environmental Assessment

This Supplemental EA expands the scope of previous analyses to include a new 2.9-mile portion on south VAFB. This Supplemental EA addresses only the implementation of the Proposed Action and its potential environmental effects.

This Supplemental EA also evaluates the potential environmental impacts of the No-Action Alternative. No other action alternatives were deemed feasible due to environmental and security constraints. Rough terrain and the presence of sensitive biological resources, and significant cultural resources preclude alternate routes; and security prohibits alignments that would extend outside of Air Force property or above the surface (i.e., aerial alignments would not be viable).

Consistent with CEQ regulations, the scope of analysis presented in this EA is defined by the potential range of environmental impacts resulting from the implementation of the Proposed Action and the No-Action Alternative. Resources potentially impacted are considered in more detail in order to determine whether additional analysis is required pursuant to 40 CFR Part 1501.4(c).

The resources analyzed in this EA include biological resources, cultural resources, and water resources.

The following resource areas were considered but not analyzed in this Supplemental EA because the magnitude of the Proposed Action is similar to that represented by the VTRS segments being realigned, and the potential impacts associated with the new realignment route would be similar to those of the segments eliminated and which were analyzed in the VTRS EA (USAF 2004): Air Quality, Earth Resources, Environmental Justice,

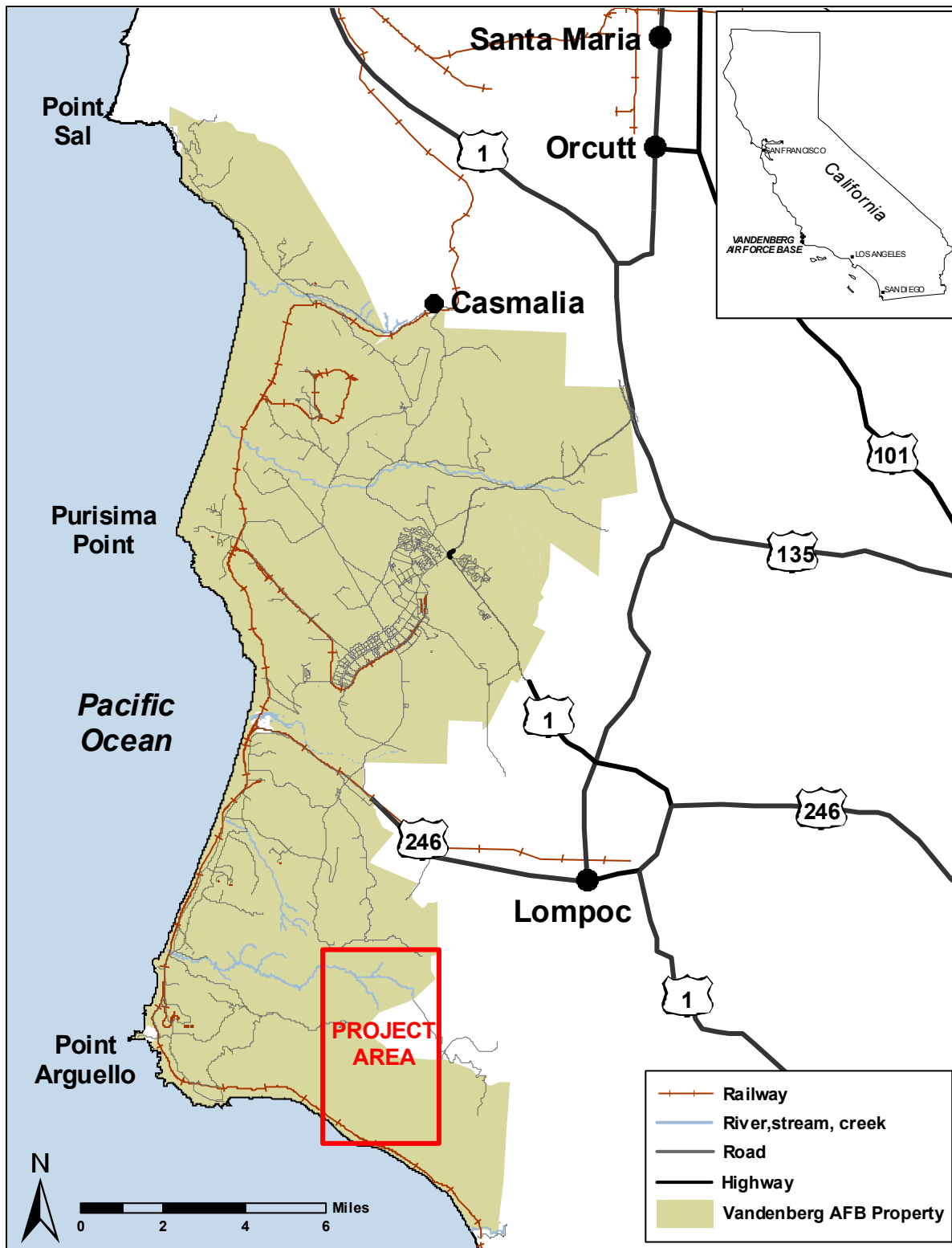


Figure 1-1. General location on VAFB of the proposed VTRS realignment.

Hazardous Materials and Hazardous Waste Management, Human Health and Safety, Land Use, Noise, Pollution Prevention, and Socioeconomics. In addition, no Installation Restoration Program sites, Areas of Concern or Areas of Interest are present within the proposed VTRS realignment route, thus there are no potential risks to workers. Transportation is not analyzed in this supplemental EA because the location of the Proposed Action would not affect local or regional transportation and traffic.

## 1.7 Applicable Regulatory Requirements

Federal and regulatory requirements that would affect the implementation of the Proposed Action and No-Action Alternative are presented in Table 1-1.

A list of acronyms and abbreviations used in this Supplemental EA is included following the Table of Contents.

Table 1-1. Federal and State laws applicable to the implementation of the Proposed Action.

Federal Regulation	Activity or Requirement
American Indian Religious Freedom Act (AIRFA) of 1978 (42 USC 1996)	The AIRFA states that the policies and procedures of federal agencies must comply with the constitutional clause prohibiting abridgment of religious freedom—including freedom of belief, expression, and exercise—for Native Americans. The AIRFA's policy is to consider Native American access to sites, use and possession of sacred objects, and freedom to worship, and directs federal agencies to revise policies and procedures to correct conflicts with Native American religious cultural rights and practices.
Archaeological and Historic Preservation Act (AHPA) of 1974 (16 USC 469a et seq.)	Directed toward the preservation of historic and archaeological data that would otherwise be lost as a result of federal construction or other federally-licensed or -assisted activities. The AHPA authorizes the Department of the Interior to undertake recovery, protection, and preservation of archaeological or historic data.
Archaeological Resources Protection Act (ARPA) of 1979 (USC 470aa-mm), Supplemental Regulations of 1984	The ARPA secures protection of archaeological resources and sites on public and Indian lands; requires permitting for any excavation or collection of archaeological material from these lands; provides civil and criminal penalties for violations.
Clean Air Act (CAA) of 1970 (42 USC 7401 et seq.)	Establishes that applicable state and national ambient air quality standards must be maintained during the operation of any emission source. National Ambient Air Quality Standards include primary and secondary standards for various pollutants. The primary standards are mandated by the CAA to protect public health, while the secondary standards are intended to protect the public welfare from adverse impacts of pollution, e.g., visibility impairment.
CAA Amendments of 1990	Establishes new federal non-attainment classifications, emissions control requirements, and compliance dates for areas in non-attainment. The requirements and compliance dates are based on the non-attainment classification.
Clean Water Act (CWA) of 1977 as amended (33 USC 1251 et. seq.)	<p>Prohibits the discharge of pollutants from a point source into navigable waters of the United States, except in compliance with a National Pollutant Discharge Elimination System (NPDES) (40 CFR Part 122) permit. The navigable Waters of the United States are considered to encompass any body of water whose use, degradation, or destruction will affect interstate or foreign commerce.</p> <p>Section 401 of the CWA requires that the discharge of dredged or fill material into water of the United States does not violate State water quality standards. Generally, CWA Sec. 404 permits will not be issued until the State has been notified and the Applicant has obtained a certification of state water quality standards.</p> <p>Section 402 of the CWA requires that a NPDES certification be obtained from the applicable Regional Water Quality Control Board (RWQCB) for projects that would disturb one or more acres of land.</p> <p>Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.</p>

Federal Regulation	Activity or Requirement
Coastal Zone Management Act (CZMA) of 1972 (16 USC 1451-1464)	The CZMA plays a significant role in water quality management. Under the CZMA, a federal action that may affect the coastal zone must be carried out in a manner that is consistent with state coastal zone management programs.
Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.)	Declares the intention of Congress to conserve threatened and endangered species and the ecosystems on which those species depend. The ESA requires federal agencies, in consultation with the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries Service), to use their authorities in furtherance of its purposes by carrying out programs for the conservation of endangered or threatened species.
Section 7 of the ESA (16 USC 1536)	Contains provisions that require federal agencies to consult with the Secretary of Interior and take necessary actions to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of endangered species and threatened species.
Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 USC 703-712)	The MBTA implements various treaties and conventions between the United States and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under MBTA, the taking, killing, or possessing of migratory birds is unlawful.
National Environmental Policy Act (NEPA) of 1969 as amended (42 USC 4321-4347)	Requires federal agencies to analyze the potential environmental impacts of major federal actions and alternatives and to use these analyses as a decision-making tool on whether and how to proceed.
National Historic Preservation Act (NHPA) of 1966 as amended (16 USC 470 et seq.)	The key federal law establishing the foundation and framework for historic preservation in the United States. The NHPA 1) authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (National Register); 2) establishes an Advisory Council on Historic Preservation (Council) as an independent federal entity; 3) requires federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Council an opportunity to comment upon any undertaking that may affect properties listed, or eligible for listing, in the National Register; and 4) makes the heads of all federal agencies responsible for the preservation of historic properties owned or controlled by them.
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC 3001-3013)	The NAGPRA restores certain rights to Native Americans with respect to the disposition of ancestral human remains and cultural objects; vests ownership of these materials (from federal or tribal lands) with designated Native American groups; requires notification of federal agency head when Native American cultural items are discovered on federal or tribal lands; prohibits trafficking in Native American human remains and cultural items; requires inventory and tribal notification of human remains and associated funerary objects held in existing collections by museums or federal agencies; provides for repatriation of these materials.
Pollution Prevention Act (PPA) of 1990 (42 USC 13101-13109)	This Act establishes that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and that disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.
Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.)	This Act gives the Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.
Title II of the Toxic Substances Control Act (TSCA) of 1976 (15 USC 2601 et seq.)	The primary goal of TSCA is to control chemical hazards through the regulation of listed chemicals in commerce, including manufacture, import, processing, distribution, use, and disposal. TSCA has been amended with Title II to specifically address such substances as asbestos-containing materials.
State Regulation	Activity or Requirement
California Coastal Act of 1976	This Act provides long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the Coastal Commission in its coastal development permit decisions and for the review of local coastal programs prepared by local governments and submitted to the Commission for approval. These policies are also used by the Commission to review federal activities that affect the coastal zone.

State Regulation	Activity or Requirement
California Clean Air Act of 1988	<p>This Act develops and implements a program to attain the California Ambient Air Quality Standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter less than or equal to 10 microns in diameter, lead, sulfates, hydrogen sulfide, and vinyl chloride.</p> <p>40 CFR Part 51 gives state and local agencies the authority to establish air quality rules and regulations. Rules adopted by the local air pollution control districts and accepted by the Air Resources Board are included in the State Implementation Plan. When approved by the U.S. EPA, these rules become federally enforceable.</p>
Porter-Cologne Water Quality Control Act	<p>Protects all waters of the state for the use and enjoyment of the people of California and declares that the protection of water resources be administered by the regional water quality control boards.</p>



## Chapter 2. Description of the Proposed Action and Alternatives

This chapter describes the Proposed Action and the No-Action Alternative. Environmental constraints (i.e., rough terrain and biological and cultural resources), along with security constraints that would accompany aerial and off-Base alignments, preclude other alternatives from being viably considered. The following discussions include projected equipment needs, construction requirements, and operational parameters for the Proposed Action. Background information documenting the parameters for the installation of the VTRS and CITS project was provided in the VTRS EA (USAF 2004) and CITS EA (USAF 2006), incorporated by reference.

### 2.1 Proposed Action

The VTRS EA (USAF 2004) proposed installing approximately 11 miles of subsurface fiber optic cable on South VAFB. As described in the CITS EA (USAF 2006), the VTRS fiber optic cable installation is part of the overarching CITS project. During the implementation phase of CITS, a need to realign the selected route was identified due to environmental conditions (erosion and steepness of terrain) observed in a portion of the VTRS route (Segments 4 through 8). A new route was identified to replace 3.7 miles of VTRS segments. The proposed 2.9-mile realignment route would span from Honda Ridge Road east of Tranquillon Mountain and continue southeast for about 1,935 feet and then south for about 5,875 feet along the top and side of a ridge, on existing roads. It would then cross westward through open space over that ridge, and north up the crest of the next ridge east on an existing road. The new segment would terminate at the beginning of the existing VTRS Segment 9 (Figure 2-1 and Figure 2-2). Elevations on the route range from 1,588 feet at Honda

Ridge Road down to 328 feet at its southern tip.

Two manholes would be installed along this proposed realignment to provide access for maintenance of the fiber optic line after installation. Access for installation of the fiber optic cable would occur from Honda Ridge Road and from Coast Road on established roads/trails.

The proposed realignment would be installed along existing unpaved roads/established trails with the exception of approximately 3,200 feet, which would be installed in open space.

#### 2.1.1 Installation Methods

The installation consists of the subsurface placement of 0.75-inch cables inside tubular conduits ranging in size from 1.25 inches to four inches in diameter. Conduits are constructed of either High-Density Polyethylene (HDPE) or Poly-Vinyl Chloride (PVC).

Two methods of installation are proposed: direct burial by plowing, and horizontal directional drilling (HDD) boring.

##### Plowed Conduit/Cable

Conduit is plowed into place when 1) terrain is relatively even and free of rock outcroppings; 2) there is sufficient room for the plow to maneuver; and 3) few underground utilities exist along the route.

► Using a treaded, two-track vehicle, the conduit and subduct system are simultaneously plowed into the ground at an angle of 30 degrees vertical with respect to grade. The plow has an approximate overall width of eight feet, with each of the two tracks measuring approximately two feet in width. Soil is initially pushed aside during plowing,

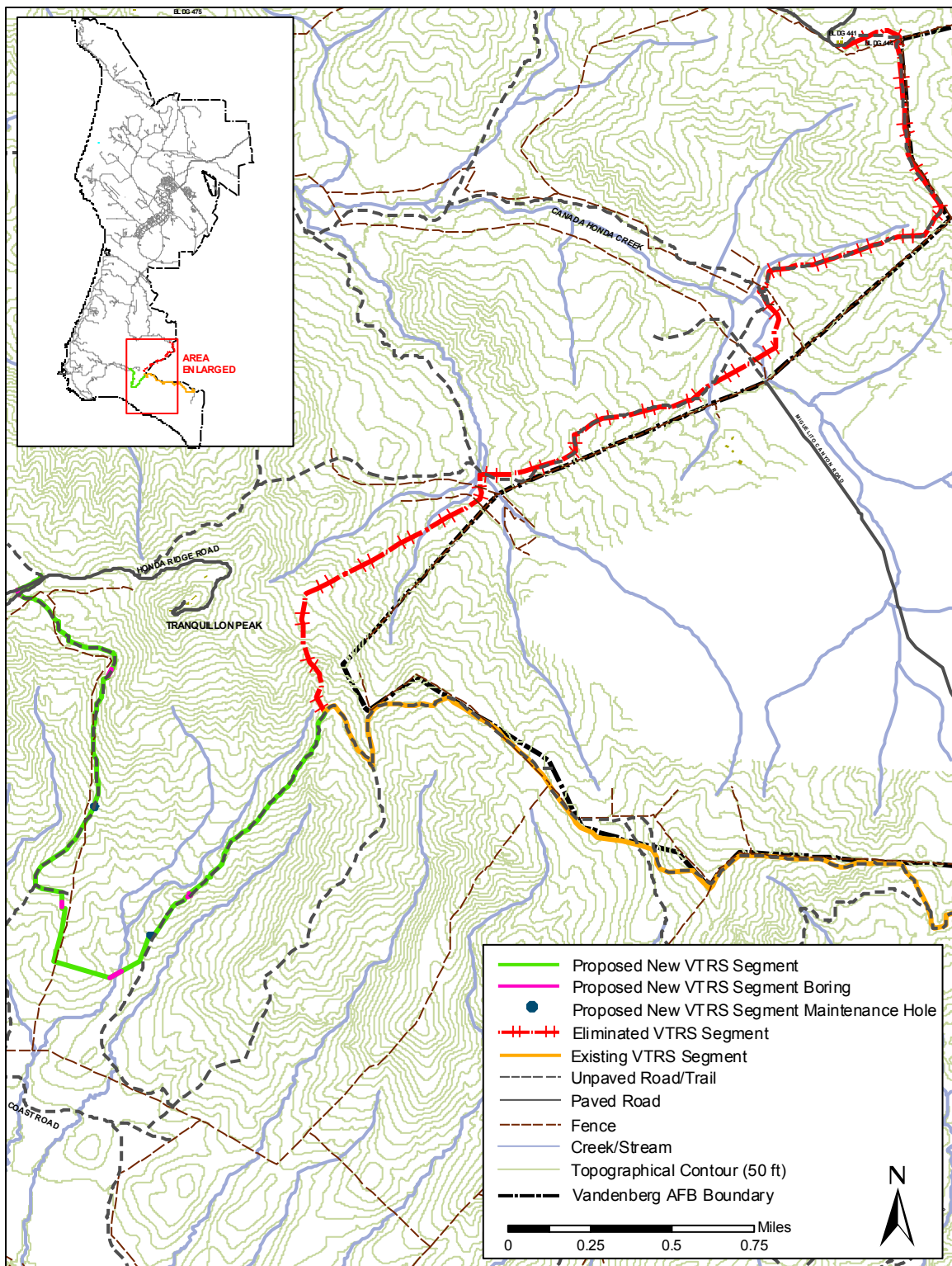


Figure 2-1. Location of the realignment for the VTRS route on South VAFB.

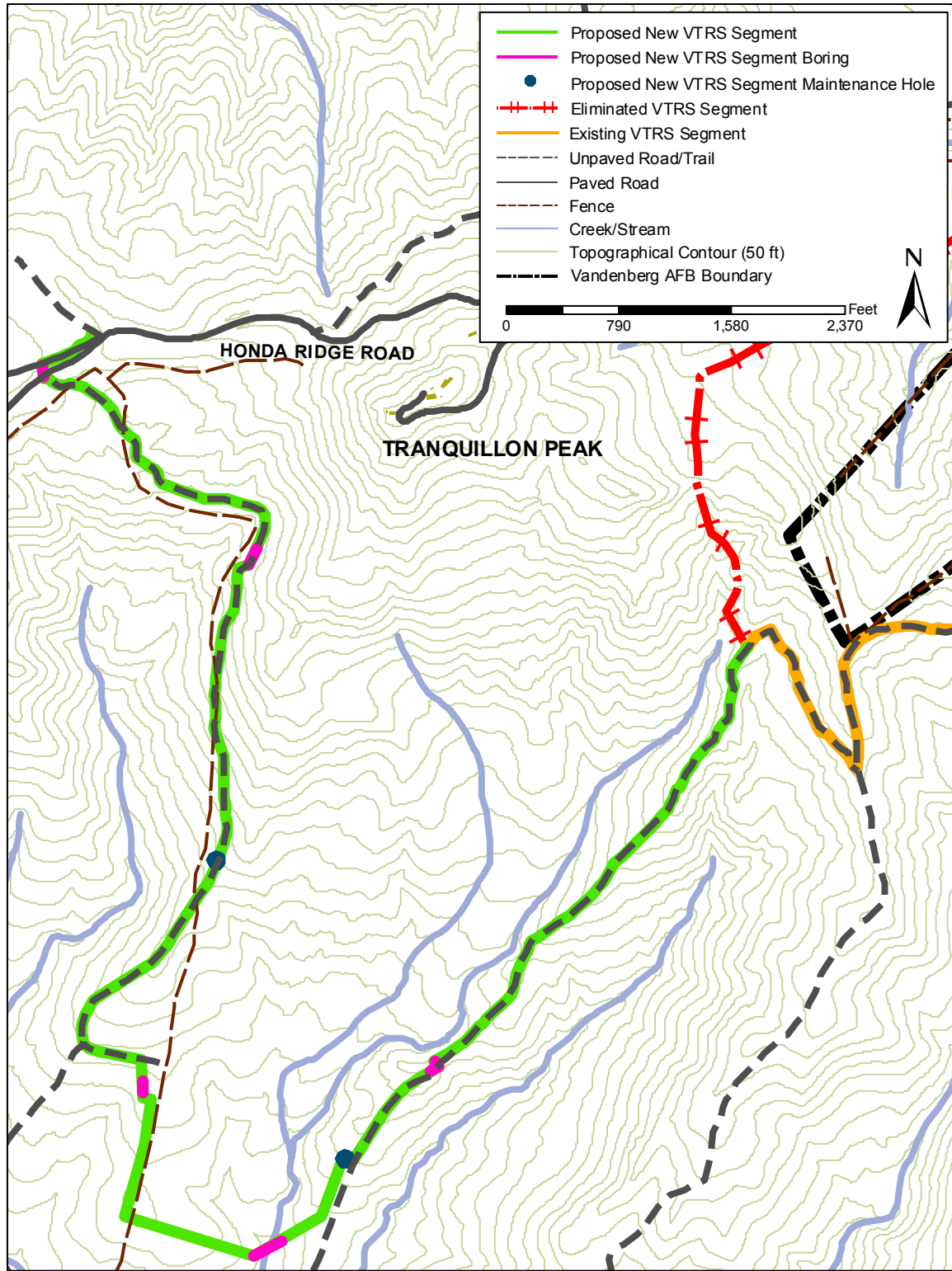


Figure 2-2. Proposed new route for the VTRS realignment.

but falls back around the newly laid conduit. At a plow depth of 36 inches, the temporarily displaced soil spreads out to a width of approximately 12 inches (i.e., six inches on each side of the plowed area). The approximate overall width needed for this operation is 10 feet.

### **Bored Conduit**

HDD boring is typically employed to avoid sensitive environmental areas (i.e., cultural resources and biological resources) where plowing would have adverse effects. The Proposed Action would require boring at five small sites (one creek and four locations to avoid cumbersome ground surface).

An area approximately three feet wide, four feet long and five feet deep would be excavated at each bore entry and exit points. None of the bores will exceed 300 feet in length or 25 feet in depth below grade. A surface-operated drilling device would be angled into the ground from the surface at the entry pit and directed to its destination using a radio-controlled mole that contains a cutter head. Personnel directing the mole control its depth and direction of excavation. A track-mounted diesel bore rig would be used at the drill site. Once the bore head is drilled to destination location, the tunnel is reamed as required and HDPE rollpipe is placed. Fiber optic cable is then pulled or blown through the pipe.

During the typical boring process, bentonite fluid is pumped through the borehole to lubricate the drill bit, carry drill cuttings to the surface, and prevent the bore tunnel from collapsing. The boring fluid is typically stored in tanks at the drill site when not in use. After the bore is completed, any excess slurry remaining is removed from the site and either reused by the drilling contractor or disposed of at an appropriate facility.

Although it is not a common occurrence, fluid can escape the borehole through fissures or cracks in the soil and reach the ground surface. This is commonly referred to as a “frac-out.” Every effort would be made to complete directional bores at depths so as to

prevent bentonite releases. Containment measures included in the Storm Water Pollution Prevention Plan (SWPPP) would be implemented as needed, and a Frac-Out Contingency Plan would be implemented as needed to contain and manage any frac-out material.

### **2.1.2 Construction Equipment**

The type of construction equipment that would be used for implementing the Proposed Action is presented in Table 2-1. The exact type of equipment that would be used may vary slightly from these projections. This estimate provides a basis for analyzing related issues, such as air quality.

### **2.1.3 Access and Staging Areas**

Access to the realignment route would be from Coast Road. A truck trailer would deliver the plow where it would be unloaded along the fence line for access through the two established trails as depicted in Figure 2-3. All equipment will have rubber tires, except for the plow, which is a track vehicle.

The staging areas for construction equipment and supplies would be established along the path of the proposed realignment route, within established trails or work areas.

### **2.1.4 Construction Personnel and Schedule**

Approximately seven to eight workers, at most, would be required. The construction period for this realignment route would last approximately four weeks, with 8-hour workdays and 5-day workweeks. Implementation would occur in October/November 2007 (weather permitting), and no later than spring 2008.

### **2.1.5 Protection Measures**

To avoid or minimize potential adverse effects to resources during construction activities associated with the Proposed Action, the protection measures outlined below would be implemented. For resource areas not listed, protection measures would not be needed.

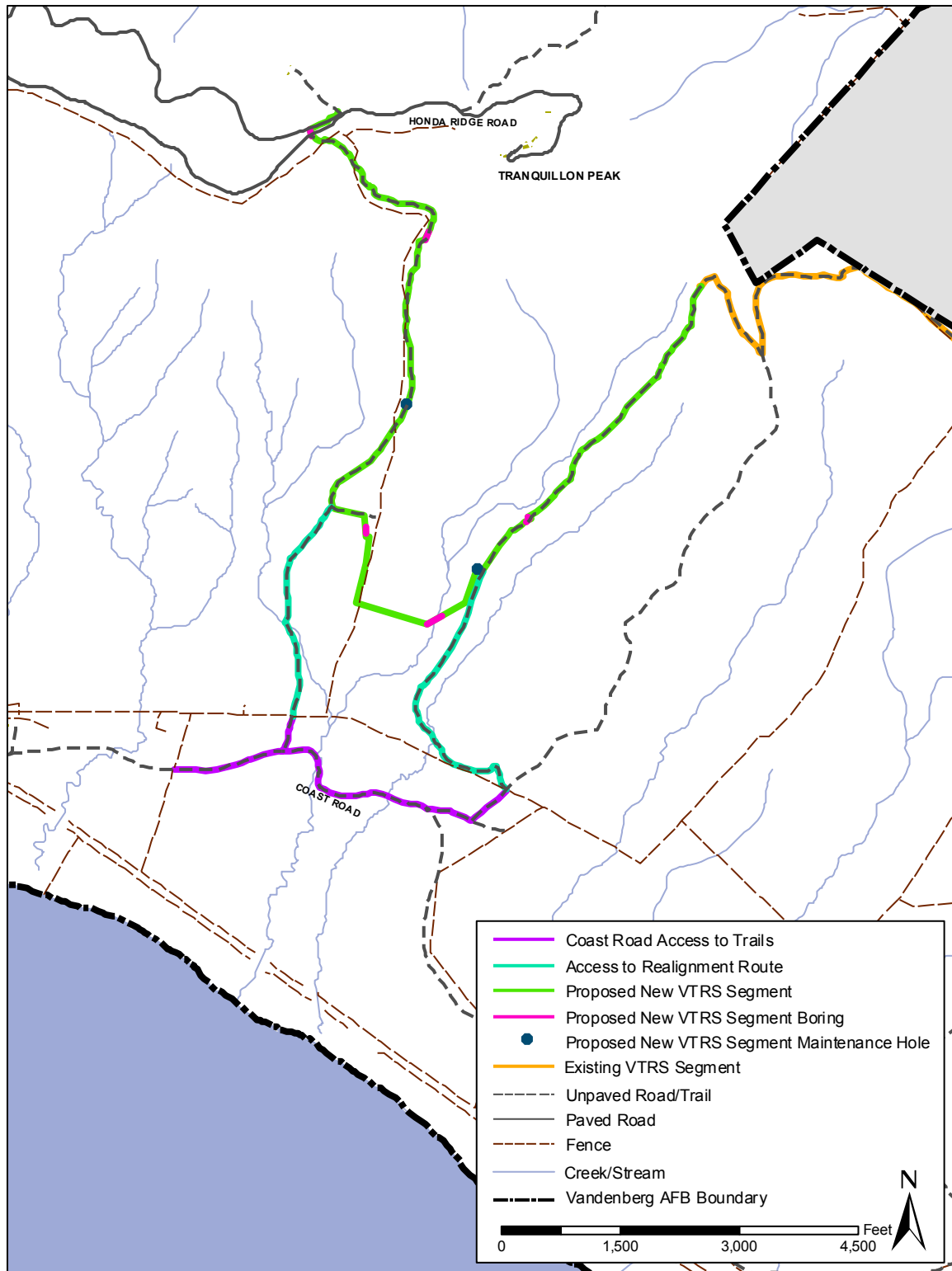


Figure 2-3. Construction equipment access to proposed VTRS realignment route.

Table 2-1. Equipment list for VTRS realignment route.

Equipment	Function	Make/Model	Size/Horsepower	Rubber Tire/Tracked	Gas/Diesel	Estimated # of Hours per Day *
Flat Bed Truck	Foreman's Truck	F-450 Truck Crew	1 Ton/325hp	Rubber Tired	Diesel	2
Flat Bed Truck	Work Truck	Sterling Bed Flat	2.5 Ton/330hp	Rubber Tired	Diesel	2
Dump Truck	Dump Truck	Internation 2647 Truck	10 Dump/365hp Yard	Rubber Tired	Diesel	6
Vactron	Potholing	Vactron	800 Gal Vac	Rubber Tired	Diesel	1
Toe Cat	Plowing	Cat D7 Winch Cat	D7g/200hp	Tracked	Diesel	6
Cable Plow	Plowing	Cat D7 Plow	D7g/200hp	Tracked	Diesel	6
Dozer	Clean Up	John Deere	Jd 450/70hp	Tracked	Diesel	4
1 Ton Truck	Crew Truck	Ford Flatbed	7.3l	Rubber Tired	Diesel	1 - 2
Plow	Plow Cable					5 - 6
Pick Up	Crew Truck	Ford Pick Up	F150 4.2l	Rubber Tired	Gas	1 - 2
Pump	Pump H2O	Honda	4.5 Hp		Gas	0 - 1
Generator	Portable Power	Brigss Stratton &	8 Hp		Gas	0 - 1
Blower	Mh Purging	Brigss Stratton &	3 Hp		Gas	0 - 1
Wacker	Compaction	Wacker	3 Hp		Mix Gas	1 - 2
Air Compressor	Blowing Ducts	185	4.5l			1 - 2
Bore Machine	Boring	1720 Jetrac	17000 # Machine - 85 Hp		Diesel	3 - 4
Excavator	Mini Excavator	Mx272	25 Hp		Diesel	3 - 4
Vac	Vactor	Vacmaster T-800	12 Hp		Gas	1 - 2
Water Truck					Diesel	3

### Air Quality

The following Santa Barbara County Air Pollution Control District (SBCAPCD) dust control measures would be required to decrease fugitive dust emissions from ground disturbing activities:

- ▶ Apply water - preferably reclaimed - at least twice daily to dirt roads, graded areas, and dirt stockpiles to prevent excessive dust at the staging areas. Chlorinated water would not be allowed to run into any waterway.
- ▶ Minimize vehicle speeds on exposed earth.
- ▶ After completion of construction activities, treat disturbed soil by watering, revegetating, or spreading soil binders to prevent wind erosion of the soil.
- ▶ Limit ground disturbance to the smallest, practical area and to the least amount of time.
- ▶ Designate personnel to monitor construction to ensure that excessive dust is not generated at construction sites.
- ▶ Comply with 1) the SWPPP, including Best Management Practices (BMPs) to reduce dust emissions, and 2) the contractor's Environmental Protection Plan, which includes dust control compliance measures.

### Biological Resources

Potential adverse effects to biological resources would be avoided during construction activities associated with the Proposed Action through implementation of the following construction constraints and monitoring measures:

- ▶ A qualified biologist would flag and isolate the site where Gaviota tarplant (*Deinandra increscens* spp. *villosa*) occurs, and all stands of seacliff buckwheat (*Eriogonum parvifolium*) to protect the plants, and in the case of buckwheat, the federally endangered El Segundo blue butterfly (*Euphilotes battoides allyni*), during construction activities.

▶ Construction activities would occur outside the El Segundo blue butterfly flight period (June through August).

▶ The construction crew would be instructed on work area boundaries, including staging areas, and restricted from accessing any areas outside of these boundaries.

▶ Removal of native vegetation and plant communities would be minimized to the greatest extent possible.

- A qualified biologist would be present during the initial clearing of vegetation. Any wildlife uncovered during these activities would be moved to suitable habitat outside of the construction area.

- Where possible native vegetation would not be excavated because leaving root systems intact would allow native vegetation to resprout.

▶ To minimize the potential for wildlife entrapment trenches and holes would not be left open overnight, whenever possible.

- Trenches or segments of trenches and holes that must be left open at the end of the workday would be ramped at a 45-degree angle or less to minimize the potential for entrapment of wildlife.

- A qualified biologist would inspect any trenches left open overnight before the start of construction and remove any trapped wildlife to suitable habitat outside of the construction area.

▶ In areas near streams the contractor would implement appropriate erosion and silt control measures to minimize adverse impacts to these sensitive habitats.

▶ All excavated soil would be placed within the work boundary limits.

▶ The construction contractor would provide biological monitors with a schedule of planned construction activities 48 hours in advance.

### Cultural Resources

Five of 16 previously recorded sites located within 0.25 mile of the proposed VTRS

realignment route and the associated access roads are on or adjacent to some portion of the project. The route has been chosen to stay at least 30 meters away from known archaeological sites. In two cases where the route is close to sites, it is vertically separated from the site boundary by steep slopes. Installation of the cable would not affect any of the sites. Four sites are located on the access roads. For three of the sites vehicle traffic would be restricted to the existing road where no cultural material was found. Site CA-SBA-627 has midden material in the road; this site would be avoided by bringing equipment through Honda Ridge Road. No off-road travel or equipment staging would be permitted within the boundaries of known archaeological sites. All five sites will be visually indicated by either orange temporary exclusionary fencing or flagging to denote areas prohibiting vehicular or pedestrian traffic. These measures should prevent project activities from affecting known cultural resources.

#### **Hazardous Materials and Hazardous Waste**

Strict compliance with all applicable regulations, including 30 SW Plan (30 SWP) 32-7086, *Hazardous Materials Management Plan*, would avert the potential for adverse impacts to the environment as a result of the presence and use of hazardous materials during the Proposed Action.

Strict compliance with all applicable regulations, including 30 SWP 32-7043A, *Hazardous Waste Management Plan*, would avert the potential for adverse impacts to the environment as a result of the potential generation of hazardous waste during the Proposed Action.

Implementing the measures presented below would further minimize the potential for adverse impacts from hazardous materials or hazardous waste.

- ▶ All hazardous materials would be properly identified and used in accordance with manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and

maintain construction equipment. Bentonite would be managed to minimize any fugitive dust emissions into the environment.

- ▶ All equipment would be properly maintained and free of leaks during operation. Because there are no controlled, paved areas in this remote location, secondary containment would be used for all necessary equipment maintenance, fueling, and repairs to minimize risks from accidental spillage or release.

#### **Human Health and Safety**

To provide for the health and safety of workers and visitors who may be exposed to the operations of the Proposed Action, the construction contractor would comply with federal Occupational Safety and Health Act (OSHA) requirements over the entire project. The contractor would also supply a health and safety plan to VAFB. Additionally, the contractor would coordinate with Explosive Ordnance Disposal (EOD) Flight prior to implementing the Proposed Action to ensure no adverse effects on human health and safety would occur from unexploded ordnance issues.

To minimize the potential adverse impacts from biological hazards (e.g., snakes and poison oak) and physical hazards (e.g., rocky and slippery surfaces), awareness training would be incorporated into the worker health and safety protocol.

No Installation Restoration Program sites, Areas of Concern or Areas of Interest occur within the proposed VTRS realignment route, or its vicinity.

#### **Water Resources**

The Proposed Action would be added to the CITS project National Pollutant Discharge Elimination System (NPDES) Construction General Permit coverage by amending the Notice of Intent and the SWPPP. Compliance with NPDES Construction General Permit conditions should minimize potential adverse impacts to water resources.



In addition, implementation of the measures described below should further reduce the potential for adverse effects to water resources:

- ▶ BMPs, including erosion and sediment control, proper spill prevention practices for all stored liquids and construction vehicles, and permanent erosion control, would be implemented to prevent sediment or chemicals from entering stream waters.
- ▶ Approval would be obtained from the 30th Environmental Flight, Compliance Office (30 CES/CEVC), Water Resources Manager, prior to any release to grade of any water (Discharge to Grade Program).
- ▶ Industrial wastewater (water containing prohibited chemical levels) would be taken to the industrial wastewater treatment ponds.
- ▶ Spill protection measures and a Frac-Out Contingency Plan, including placement of temporary berms and silt fencing, would be implemented during boring operations to prevent contamination and to contain bentonite in the event of an accidental release into the environment.
- ▶ After completion of construction activities, areas with exposed disturbed soil would be stabilized per the NPDES Construction General Permit (refer to Section A, item 7, page 15 of the NPDES Construction General Permit).

## 2.2 No Action Alternative

The No-Action Alternative would consist of not realigning the VTRS route, therefore installation of fiber optic cable along this new route would not occur and there would be no construction activities and project-related environmental impacts associated with the realignment. Because the original route for VTRS segments 4 through 8 is not feasible, without this realignment of the VTRS fiber optic cable, the CITS upgrade would not be completed. As previously discussed in the VTRS EA (USAF 2004) and the CITS EA (USAF 2006), incorporated by reference, reliability would be compromised and additional facilities would remain unconnected to the system and therefore lack integrated high bandwidth networking options. CITS is considered a part of the national defense system by the Air Force, and this system would not be operating at its full potential.

The VTRS EA (USAF 2004) and CITS EA (USAF 2006), incorporated by reference, analyzed and discussed the consequences of installing new fiber optic cable to meet national defense system requirements. These analyses and discussions presented in Chapters 3 and 4 of the two documents are incorporated here by reference.

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## Chapter 3. Affected Environment

This chapter describes the existing environmental conditions at VAFB, near and within the project area for the Proposed Action. The environmental components addressed in this section include relevant natural and human environments that are likely to be affected by the Proposed Action and the No-Action Alternative. For the reasons outlined in Section 1.6, and because they were sufficiently analyzed in the VTRS EA (USAF 2004), incorporated by reference, the following resource areas are not discussed further: Air Quality, Earth Resources, Environmental Justice, Hazardous Materials and Hazardous Waste Management, Human Health and Safety, Land Use, Noise, Pollution Prevention, and Socioeconomics.

### 3.1 Biological Resources

Federal agencies are required by Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 *et seq.*), to assess the effect of any project on federally listed threatened and endangered species. Under Section 7, consultation with the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries Service) is required for federal projects if such actions could directly or indirectly affect listed species or destroy or adversely modify critical habitat.

It is also Air Force policy to consider listed and special status species recognized by state agencies when evaluating impacts of a project. Impacts to biological resources would occur if special status species (i.e., endangered, threatened, rare, or candidate) or their habitats, as designated by federal and state agencies, would be directly or indirectly affected by project-related activities. These

impacts can be short- or long-term impacts, such as short-term impacts from noise and dust during construction, and long-term impacts from the loss of vegetation and, consequently, loss of habitat for wildlife.

Biological resources on VAFB are abundant and diverse compared to other areas of California because VAFB is within an ecological transition zone where the northern and southern ranges of many species overlap, and because the majority of the land within the base boundaries has remained undeveloped.

Potential occurrence of plant and wildlife species was determined based on field surveys conducted for this project, on past documentation of special status species within the vicinity of the project area, and on the suitability of habitat and occurrence within the region of a particular species. The scope of the survey includes vegetation and wildlife resources, as well as waters of the United States and wetlands.

#### 3.1.1 Methodology

A literature search, general biological survey, and special-status species survey were used to characterize the biological resources within the proposed project area. Field surveys and habitat assessments were completed in July 2007 and covered a corridor extending 60 feet on either side of the route. Dominant plant species, special status plant species, and vegetation types were identified and documented. Sight, sound, tracks, or other signs determined presence of common and special status wildlife species. Special status wildlife species surveys were also completed in suitable habitats occurring along the proposed cable route. In addition, existing vernal pool fairy shrimp protocol survey maps (SRS Technologies 2006) and Gaviota tarplant location maps from 2005 and 2006

field surveys were superimposed over the proposed new VTRS segment, via Geographic Information System (GIS) layers, and intersecting occupied habitat was documented and/or reviewed.

Potential occurrence of plant and wildlife species, including special status species, undetected during field surveys was determined based on suitable habitat preferences and on known occurrence based on literature searches and other existing documentation. Sources used to determine potential occurrence include literature and maps of natural resources present at VAFB (USAF, in progress), California Natural Diversity Database (CNDDB); California Department of Fish and Game [CDFG] 1999, 2001, 2004a, 2004b) and existing local and regional references (Christopher 1996, 2002; Coulombe and Mahrdrdt 1976; Holmgren and Collins 1999; Keil and Holland 1998; Lehman 1994).

### 3.1.2 Plant Communities

Three distinct plant communities were identified along the proposed new VTRS realignment: central coast scrub, chaparral, and non-native grassland (Figure 3-1). Plant communities are described in more detail below. Where suitable, nomenclature follows Holland (1986). Plant species nomenclature follows Hickman (1993). Plant communities were further subdivided based on the dominant plant species present (Figure 3-1). Where suitable, nomenclature for the subdivisions follows Sawyer and Keeler-Wolf (1995).

#### Non-native Grassland

These grasslands are characterized by a dense to sparse cover of annual grasses with flowering culms up to two feet high, which are often associated with numerous species of native wildflowers. Dominant plant species include bromes (*Bromus* spp.), wild oats (*Avena* spp.), foxtail barley (*Hordeum murinum leporinum*), ryegrass (*Lolium* spp.), fescues (*Vulpia* spp.), and mustards (*Brassica* spp.). Gaviota tarplant may be found at

variable densities within this vegetation type. The non-native grassland along the proposed route is subject to cattle grazing.

#### Central Coast Scrub

This vegetation type is characterized by shallow-rooted, mesophytic plant species that are often drought-deciduous and summer-dormant. Dominant native species at this site include California sagebrush (*Artemisia californica*), coyote brush (*Baccharis pilularis*), and purple sage (*Salvia leucophylla*). Herbaceous species such as Gaviota tarplant may be present in clearings between shrubs; however, no tarplant were found within this community along the proposed route. Seacliff buckwheat, host to the federally endangered El Segundo blue butterfly, is also present within this vegetation type.

#### Central Coast Maritime Chaparral

Chaparral is a dense, evergreen, rigid, fire-adapted form of shrubby vegetation native to California's coastal areas. Central coast maritime chaparral, which includes Burton Mesa chaparral, is restricted mostly to VAFB and its vicinity where it occurs on mesas and higher ridges. Central Coast Maritime Chaparral is dominated by manzanitas (*Arctostaphylos* spp.), California lilacs (*Ceanothus* spp.), and chamise (*Adenostoma fasciculatum*). Seacliff buckwheat is occasionally present within this vegetation type.

### 3.1.3 Wildlife Species

Wildlife species commonly occurring along the proposed realignment route include species such as Pacific chorus frog (*Hyla regilla*), western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinata*), ringneck snake (*Diadophis punctatus*), western rattlesnake (*Crotalus oreganus*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), wrentit (*Chamaea fasciata*), loggerhead shrike (*Lanius ludovicianus*), song sparrow (*Melospiza melodia*), Western meadowlark



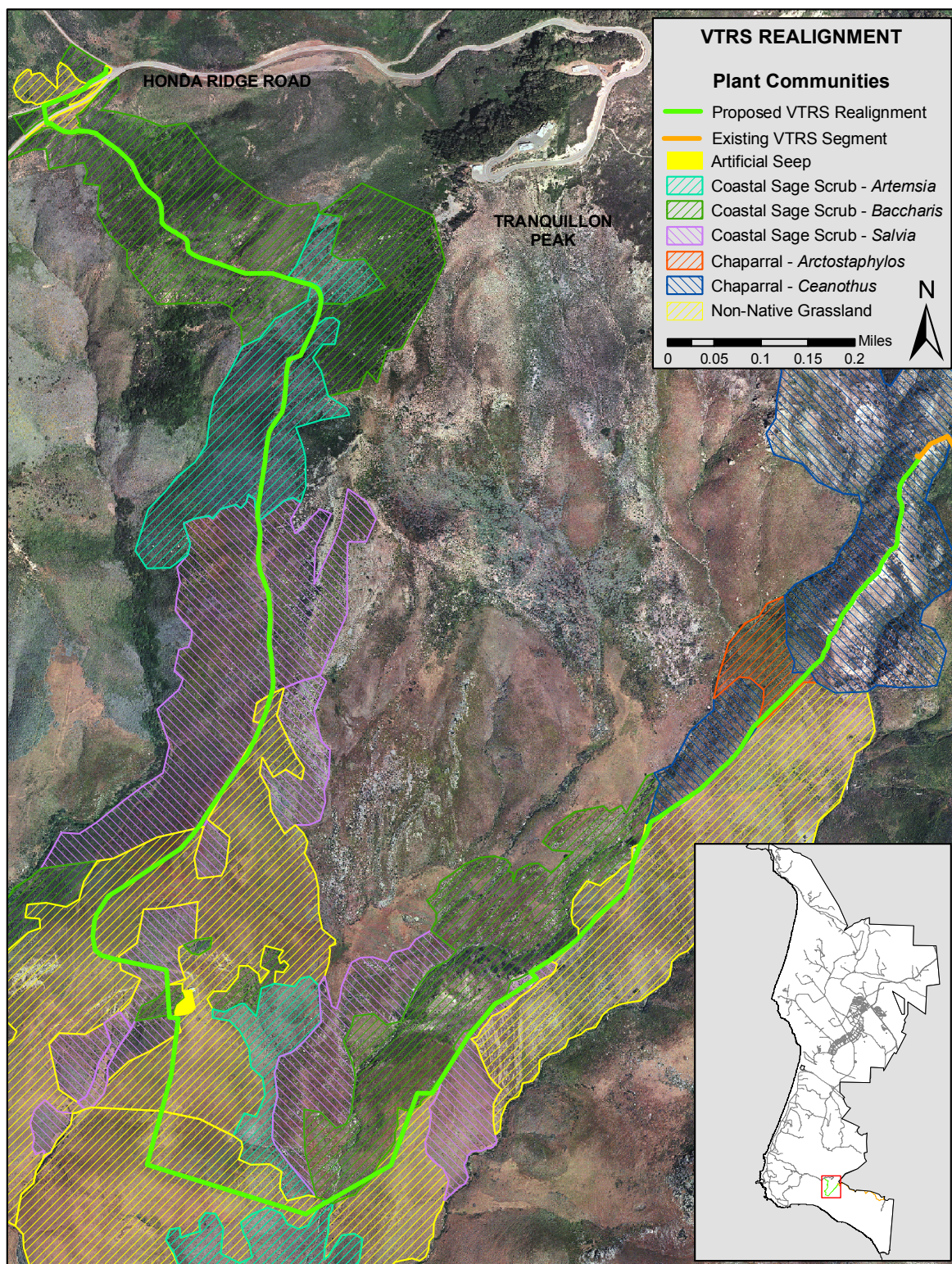


Figure 3-1. Plant communities occurring along the proposed VTRS realignment route.



(*Sturnella neglecta*), American goldfinch (*Carduelis tristis*), brush rabbit (*Sylvilagus bachmani*), Botta's pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), bobcat (*Felis rufus*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*).

### 3.1.4 Sensitive Plant Communities and Special Status Species

Table 3-1 summarizes the presence of special status species along the proposed VTRS realignment route.

#### Gaviota Tarplant

A stand of Gaviota tarplant was found near the southeastern portion of the proposed VTRS realignment route (Figure 3-2). This stand of tarplant is outside of the project area. Vehicle traffic along the road to access the VTRS realignment installation site has the potential to adversely affect tarplant. Potential impacts are avoidable by flagging tarplant prior to work activities in the area and instructing construction crews to avoid flagged areas.

#### El Segundo Blue Butterfly

Seacliff buckwheat, the host plant species for the federally endangered El Segundo blue butterfly, occurs along several sections of the

proposed VTRS realignment route. At the intersection of Honda Ridge Road and Story Road several dense stands occur within central coast scrub roadside habitat (Figure 3-3). Surveys on 3 July 2007 verified the presence of El Segundo blue butterflies at this site. Adverse effects to the butterfly and its habitat are avoidable by plowing within the footprint of the abandoned Honda Ridge Road.

Seacliff buckwheat also occurs along the side of the existing dirt road at several other locations (Figure 3-4, Figure 3-5, and Figure 3-6). In each of these cases, adverse effects to the butterfly and its habitat are avoidable by plowing in the center of the existing dirt road.

#### Loggerhead shrike

This federal Bird of Conservation Concern (BCC) is a common resident and winter visitors in lowlands and foothills throughout California. This bird prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. It builds nests on stable branches of densely foliated shrubs or trees. The breeding period extends from March through August. Loggerhead shrikes are likely to occur along the proposed VTRS realignment route.

Table 3-1. Special status plant and wildlife species along the proposed VTRS realignment route.

Description	Status*	Occurrence	Comments
<i>Deinandra increscens</i> ssp. <i>villosa</i> Gaviota tarplant	FE/SE	Documented	Blooms May-Sep
<i>Euphilotes battoides allyni</i> El Segundo blue butterfly	FE	Documented	Flight period May – Sep
<i>Lanius ludovicianus</i> Loggerhead shrike	BCC/SSC	Potential	Present year-round Breeds Mar – Aug

NOTES:

\* FE = Federal Endangered Species    SE = California Endangered Species    BCC = Federal Bird of Conservation Concern    SSC = California Species of Special Concern

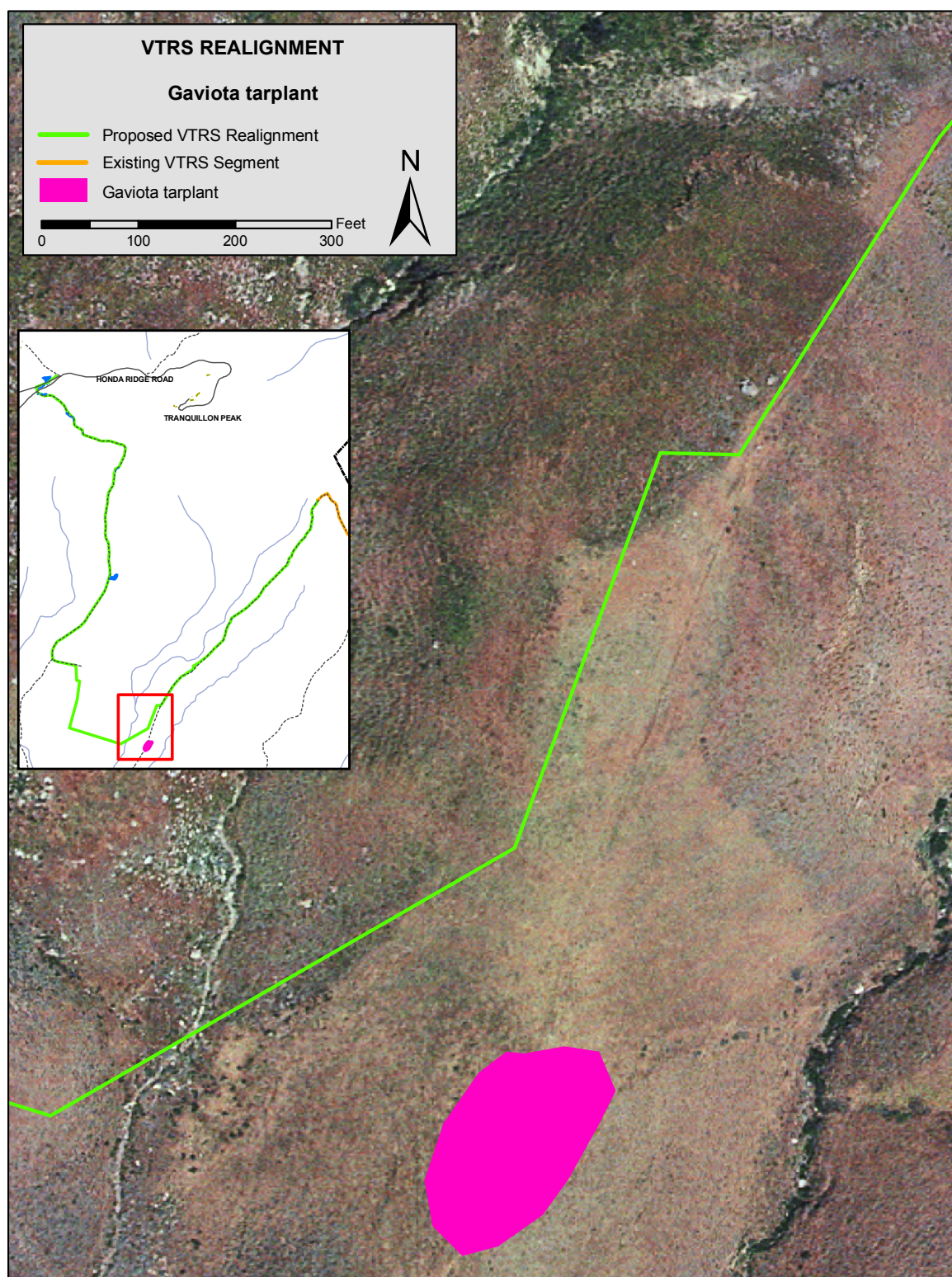


Figure 3-2. Gaviota tarplant occurrence along the proposed VTRS realignment route.



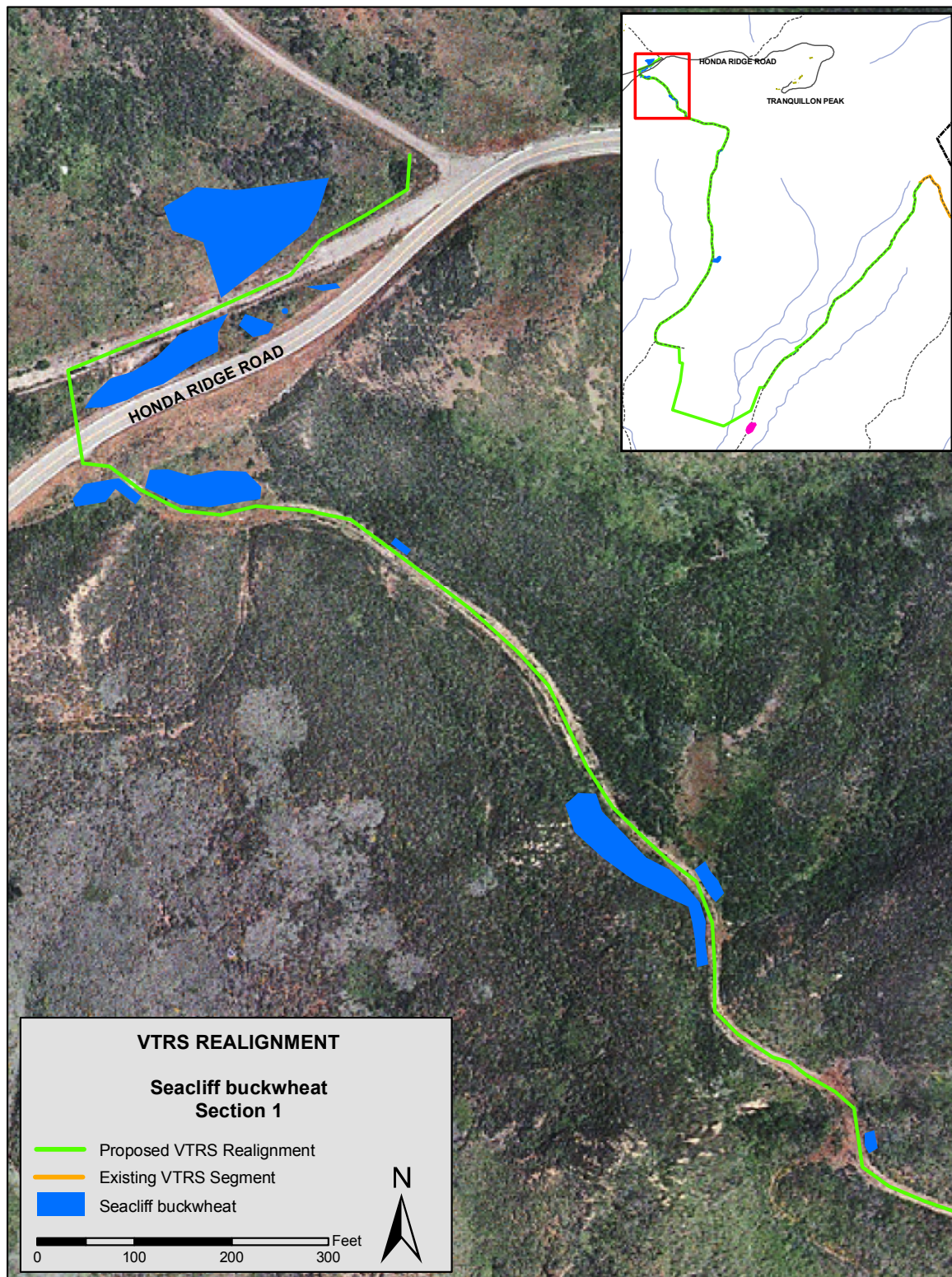


Figure 3-3. El Segundo blue butterfly habitat (seacliff buckwheat) along the proposed VTRS realignment route.



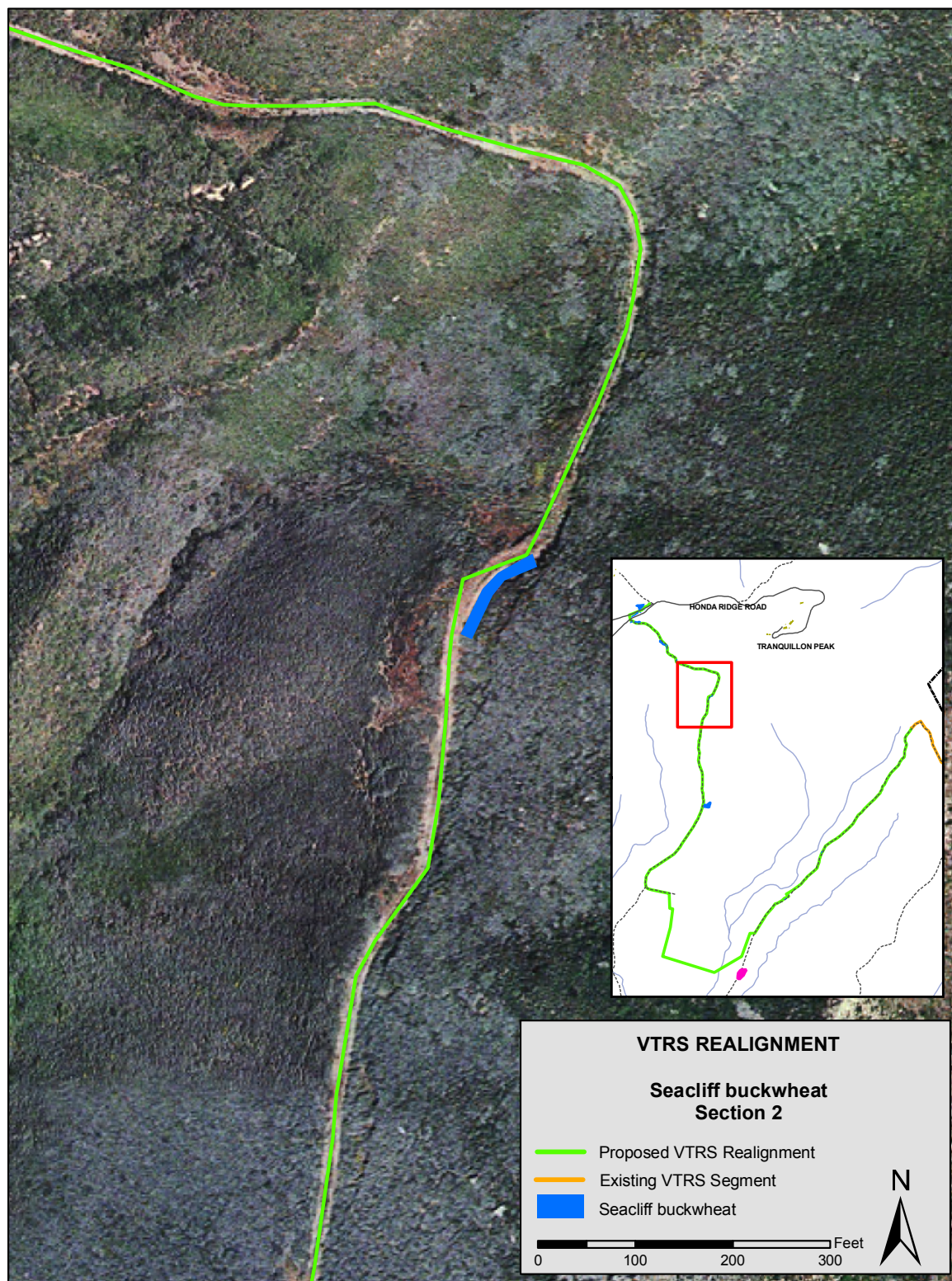


Figure 3-4. El Segundo blue butterfly habitat (seacliff buckwheat) along the proposed VTRS realignment route.



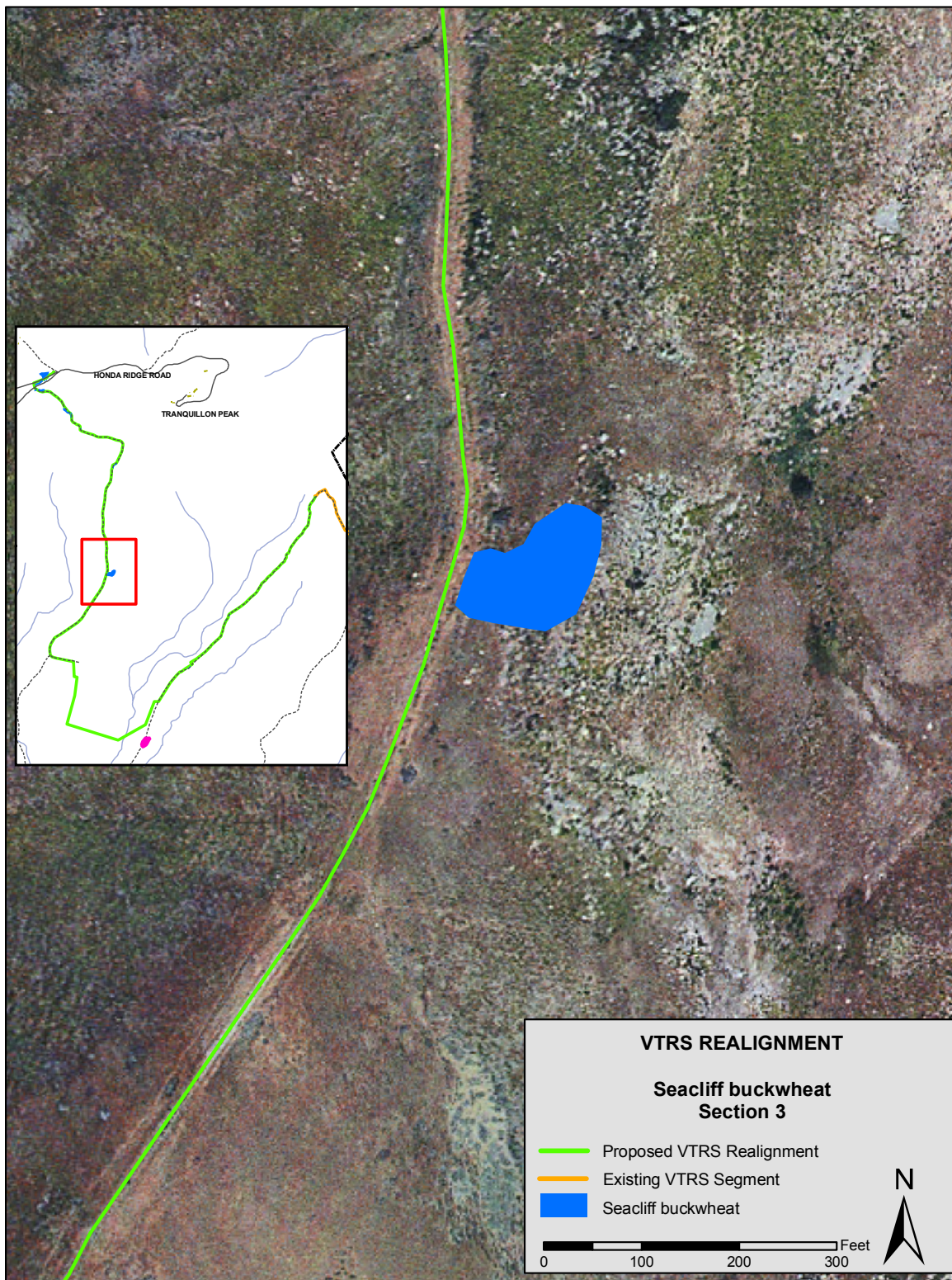


Figure 3-5. El Segundo blue butterfly habitat (seacliff buckwheat) along the proposed VTRS realignment route.



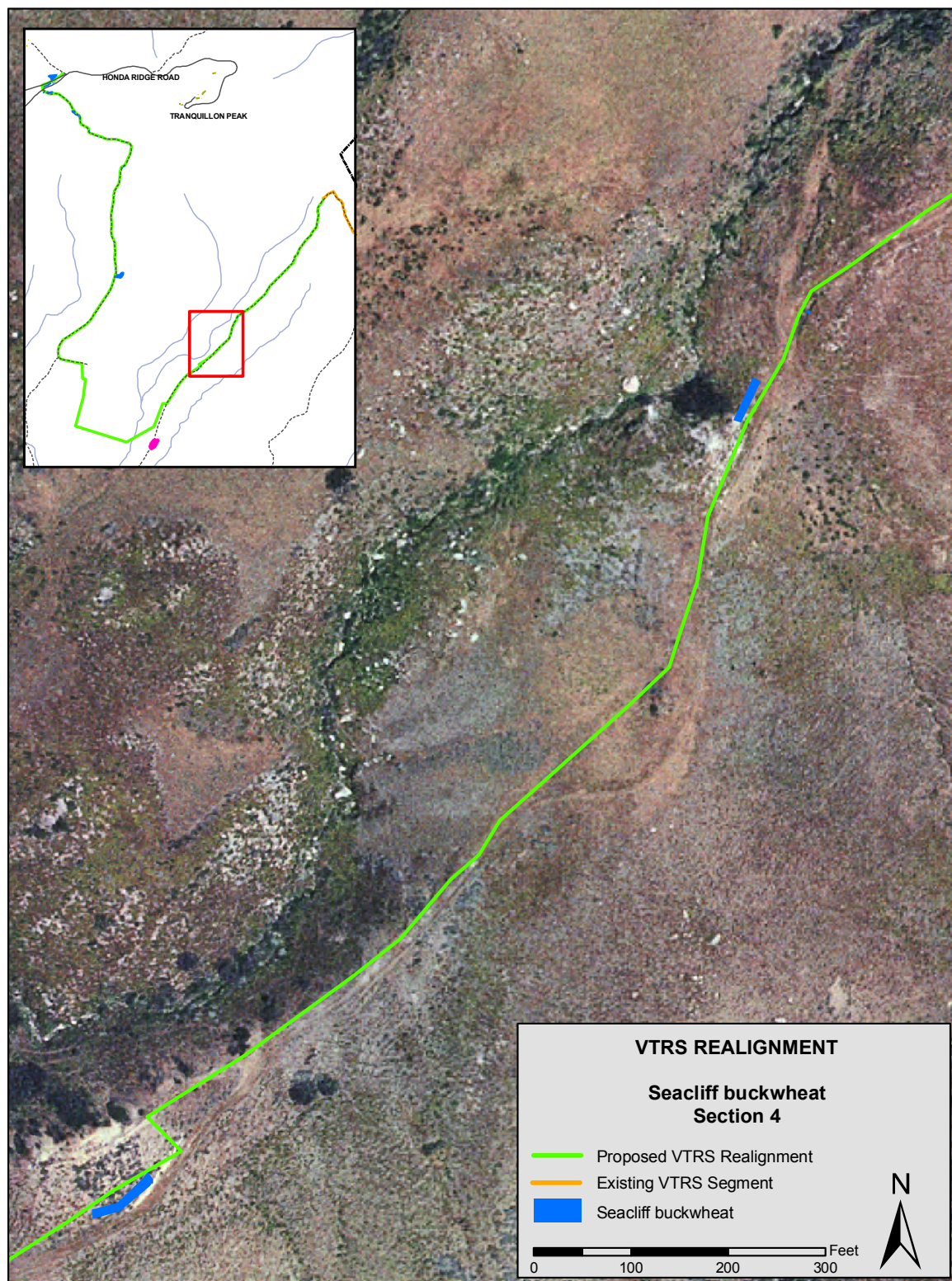


Figure 3-6. El Segundo blue butterfly habitat (seacliff buckwheat) along the proposed VTRS realignment route.

### 3.1.5 Waters of the United States and Wetlands

For the wetland hydrology criterion to be met, a site must be inundated or saturated or exhibit features that show the area was inundated or saturated for the required period of time (i.e., 45 days). A hydric soil is defined as "...a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophilic vegetation (Environmental Laboratory 1987). The proposed realignment of the VTRS route would cross one intermittent stream, which was dry during the period of the field surveys (July 2007). No wetlands or riparian vegetation are associated with this intermittent stream. HDD boring would be used to bypass this stream and avoid any adverse effects.

## 3.2 Cultural Resources

Criteria used to evaluate the significance of cultural resources and to assess potential adverse project effects are set forth in the National Historic Preservation Act (NHPA) of 1966 (as amended). Associated implementing regulations include 36 CFR 60 and 800.

A synopsis of the prehistory, ethnohistory, and history of the region is included in Appendix A.

In general the Area of Potential Effects (APE) for installation of the proposed VTRS realignment route is a corridor approximately 15 meters wide. The route chosen would mainly follow existing roads or firebreaks that are narrower. In many places the existing roads are cut and fill features along fairly steep slopes. Wherever possible the project effects would be maintained within existing disturbance. In four locations the line would bore under drainage features or difficult ground. Two manholes would be installed. The route for the cable itself was chosen to stay at least 30 meters away from any known archaeological sites.

In addition to the realignment route, two access roads (roads A and B) would be used to get the cable plow and other equipment to the project area. Both roads are existing two-track jeep trails that depart from Coast Road. The tracked cable plow and auxiliary vehicles would drive these roads to reach portions of the project area. See Figure 2-3 for project location and access routes.

An archaeological site record and literature search was completed at the 30 CES/CEVNC at VAFB and at the Central Coast Information Center, University of California, Santa Barbara (UCSB). Background research included a review of archaeological literature, archaeological base maps, and cultural resource records. Previous archaeological studies and known archaeological resources within 0.25 mile of the cable route and access roads were identified during the record search. Maps examined at 30 CES/CEVNC included the VAFB C-1 series (46 map set), the Base Comprehensive Plan GIS, and United States Geological Survey (USGS) topographic maps.

All of the VTRS realignment route has been covered by one or more previous archaeological surveys. Eighteen previous projects were identified within 0.25 mile of the project area (

Table 3-2). Projects which intersected parts of the project route are discussed below.

### 3.2.1 Cultural Resources in or Adjacent to the Project Area

The earliest project was a survey by Foley Benson in 1969 that covered a large area along the southern VAFB coast. The lower portions of the VTRS realignment route and the access roads are within the area surveyed by Benson.

Two phases of a basewide project for the VAFB Fuels Management Plan (Neff and Snethcamp 1982; Schilz et al. 1984) covered portions of the project area. This project was intended to plan for wildland fire suppression and prevention on the base. The second

phase covered some 59 miles of fuel/firebreaks and 22 controlled burns. A considerable length of both the VTRS realignment route and the access roads were surveyed as fuelbreaks, firebreaks, or planned controlled burns during this project.

In 2003 Applied Earthworks surveyed an area covering the northwest end of the VTRS cable

route for a proposed wind farm on top of Honda Ridge (Owen and Lebow 2003). No sites were recorded on this survey.

The 1998 basewide survey (Carbone and Mason 1998) was designed to fill in gaps in the surveyed areas over the entire base. Portions of this survey covered part of the VTRS realignment route project area.

Table 3-2. Previous projects within 0.25 mile of the VTRS realignment route or access roads.

VAFB Project Number	UCSB Number	Comments
-	E-3557	Spanne 2005, Phase I Archaeological Survey Report for the Lompoc Wind Farm Project Scolari and Signorelli Ranches, Upper Miguelito and Honda Canyons, Lompoc Vicinity, County of Santa Barbara California
1969-01	E-3888	Benson 1969, Archaeological Survey of Sudden Flats and Associated Canyons Vandenberg A.F.B.
1981-01	E-3668	Greenwood and Foster 1981, Range Improvement Project, Vandenberg Air Force Base Santa Barbara County, California
1982-02	E-3660	WESTEC Services 1982a, Environmental Assessment, Union Oil Company of California, Oil Exploration Project Vandenberg Air Force Base, California
1982-04	E-3722	WESTEC Services 1982b, Environmental Assessment for Land Portion, Marine/Land Seismic Tie Program Vandenberg Air Force Base Santa Barbara County, California
1982-05	E-3651	Neff and Snethcamp 1982. Vandenberg Air Force Base, California 1982 Fuels Management Program, Cultural Resources Survey/Evaluation
1983-15	E-3670	Spanne 1983, Report on Archaeological Survey of a Proposed Water Systems on Sudden Ranch Lease
1984-02	E-3662	Schilz et al. 1984, Final Report, Vandenberg Air Force Base, California 1983 Fuels Management Project, Phase II Cultural Resource Survey - Evaluation
1986-11		Gibson 1986, Results of Archaeological Surface Survey for Proposed Replacement Fence Project on the Sudden Ranch Lease Southern Vandenberg Air Force Base, CA
1988-10	E-3794	Berry 1988, Sudden Ranch Boundary Fence Survey
1989-02	E-3882	Berry 1989, Surface Survey for Security Upgrades at Purisma Point and Tranquillon Peak: Modifications and Alterations for HAIR Site and for Tranquillon Peak
1990-11	E-3767	Osland 1990, Inventory Report for the Weather Information Networks System (WINDS) Vandenberg Air Force Base, California.
1995-06	E-3797	Cagle and McDowell 1995, Archaeological Survey Report Repair and Resurface of Honda Ridge Road, Vandenberg Air Force Base, Santa Barbara County, California
1997-13		Lebow and McKim 1997, Cultural Resources Condition on Vandenberg Air Force Base Fiscal Year 1997: Zones 9 and 10
1998-03	E-3898	Carbone and Mason 1998, Basewide Survey Final Technical Report Phase I, II, and III Archaeological Survey for Cultural Resource Inventory Vandenberg Air Force Base, Santa Barbara County, California
1998-10		Wilcoxon 1998, VAFB Specific Site Revisit Project, Brief Summary. August 3-26, 1998 inclusive.
2000-15	E-3925	Palmer 2000, Vandenberg Air Force Base Cultural Resources Historic Sites Management Notebook. Results of an Inventory and Evaluation of Historic Sites, Buildings and Structures, Vandenberg Air Force base, California
2003-08	E-3961	Owen and Lebow 2003, Archaeological Survey for Proposed Wind Farm South Vandenberg Air Force Base, Santa Barbara County, California
2004-03	E-3987	Owen and Lebow 2004, Archaeological Survey of the Sudden Ranch Wildfire Burn Area on South Vandenberg Air Force Base Santa Barbara County, California

The VTRS realignment route project is also within the 7,700 acres covered by the Sudden Ranch Wildfire Burn project (Owen and Lebow 2004). Applied EarthWorks surveyed areas burned in this 2002 wildfire to determine whether the fire exposed new archaeological resources and, if necessary, to rerecord previously recorded sites. Twenty-one new sites were recorded.

### 3.2.2 Cultural Resources Within and Adjacent to the Project Area

Sixteen previously recorded sites are found within 0.25 mile of the VTRS realignment route and access roads. These are listed in Table 3-3. The route was chosen to avoid known archaeological sites. It was designed to provide a buffer of at least 30 meters between the site and the cable line. In addition, in the area of the previously recorded sites the route is on an existing road or firebreak. The access roads follow existing firebreak roads and pass through four previously recorded sites. Sites traversed by the road or which are within 60 meter of the cable route are discussed below.

Two previously recorded isolated artifacts are within 0.25 mile of the project. Both are single Monterey chert flakes. VAFB-ISO-608 is on a ridge approximately 30 meters north of CA-SBA-2865 and 15 meters east of Access Road B and VAFB-ISO-662 is on a ridge crest nearly 0.25 mile east of the northeast end of the cable line.

#### CA-SBA-623

First recorded by Spanne in 1970 as a 75-foot-diameter debitage and shell scatter, this site was expanded significantly during the basewide survey in 1994 (Carbone and Mason). During this survey two areas of higher density lithics were noted and the boundary was expanded several hundred meters to the west down Cañada de los Ladrones. Discrepancies between the written

description and the site map are apparent. A fence line and concrete water troughs described as 50 meters south of the site are clearly inside the boundaries on the map. The 1994 form notes “a very dense lithic and shell midden representing a possible village site” but does not indicate where it is located. The site was revisited during the 2004 Sudden Wildfire survey (Owen and Lebow 2004) but only five Monterey chert flakes were observed. It was also examined by McKim during a 1997 cultural resources condition assessment (Lebow and McKim 1997). She noted one area of dense deposit is obscured by thick vegetation. Access road A for the VTRS realignment route project traverses the site across its western end and the northeastern portion of the site is within 60 meters of the cable line. It is, however, some 14 meters lower in elevation on a very steep slope at this point. The site and access road were examined for the VTRS realignment route project. No cultural material was noted in the access road.

#### CA-SBA-625

Located on a ridge bench east of Cañada de los Ladrones, CA-SBA-625 was recorded in 1970 as a 100-foot-diameter low-density scatter of chipping waste and one metate fragment. It is situated around a concrete cistern/spring house with associated pipelines and water troughs. The site has been largely destroyed by historic spring development including grading, road construction and installation of pipes and water facilities. The area south of the cistern is very wet and has been heavily affected by cattle trampling. The cable line passes approximately 30 meters west of the site and about six meters lower in elevation, on a steep slope. The site was revisited during the Sudden Wildfire Survey (Owen and Lebow 2004) but no prehistoric cultural material was found. A revisit on July 30 2007 for the VTRS realignment route project also found no shell or lithics.



Table 3-3. Sites within 0.25 mile of the VTRS realignment route or access roads.

CA-SBA-619	CA-SBA-620
CA-SBA-623	CA-SBA-624
CA-SBA-625	CA-SBA-627
CA-SBA-640	CA-SBA-770
CA-SBA-1847	CA-SBA-2861
CA-SBA-2862	CA-SBA-2863
CA-SBA-2864	CA-SBA-2865
CA-SBA-2866	CA-SBA-3709

**CA-SBA-627**

This site is about 200 meters farther up the western branch of Cañada de los Ladrones from CA-SBA-623. It is mainly on a terrace north of a small tributary on the east side of the main canyon. When first recorded by Spanne in 1970 it was described as a low to moderate surface density shell and lithic scatter with several tools noted. When re-recorded after the Sudden Ranch Wildfire (Owen and Lebow 2004) it was described as a moderately dense scatter of marine shell, Monterey chert flakes, and two biface fragments on both sides of the project's Access Route A, a two-track road. The site was revisited on July 31 2007 for the VTRS realignment route project and relatively dense shell and lithics were noted. Both shell and flakes were observed in the road itself. A very small amount of material was found on the slope above the site as well.

**CA-SBA-2865**

This site was first recorded during the basewide survey in 1994 (Carbone and Mason 1998). It is described as a single Monterey chert flake and a sparse scatter of shell. The material was in a saddle on the crest of a narrow ridge. The project's Access Road B, a two-track jeep trail, traverses the western edge of the site. When it was visited for the cultural resource condition assessment in 1997, no artifacts were observed. The cable route passes approximately 30 meters west of the site boundary but it is on the

opposite side of the ridge crest with higher ground between it and the site. CA-SBA-2865 was revisited for the VTRS realignment route project on August 1 2007. One early stage biface fragment and a possible chert flake were noted on the surface. No material was noted in the road.

**CA-SBA-2866**

The site was also first recorded during the basewide survey in 1994 (Carbone and Mason 1998). One Franciscan flake, 10-plus flakes of banded Monterey chert, and one chert scraper fragment were recorded on the crest of the ridge on either side of the two-track road. No shell was observed. The site was revisited in 1997 for a cultural resources condition assessment and no new material was noted (Lebow and McKim 1997). A revisit to the site on August 1 2007 for the VTRS realignment route project did not find any cultural material. The project's Access Road B traverses the site from north to south.

**3.3 Water Resources**

In California, the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB) administer the Clean Water Act (CWA) and state water regulations. The CWA defines the standards for water quality and mandates that treated water discharged to surface water or to the ocean are subject to the requirements of a National Pollutant Discharge Elimination

System (NPDES) Construction General Permit. The Central Coast RWQCB is the local agency responsible for the VAFB area. The NPDES Construction General Permit for construction activities ensures that water discharged from a site meets water quality standards at the point of discharge.

The California Porter-Cologne Water Quality Act provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. State regulations require a Waste Discharge Requirement (WDR) for permitting discharge. A Report of Waste Discharge (RWD) (similar to an NPDES Construction General Permit application) is required for actions that will involve discharge of waste to surface and/or groundwater. The California Porter-Cologne Water Quality Act implements the NPDES program for the state.

The general storm water rainy season at VAFB is from 1 October to 15 April. This timeframe has the greatest potential of construction site pollutant runoff. The average annual rainfall is approximately 14.7 inches (unpublished data, 30 SW).

### **3.3.1 Surface Water and Floodplains**

The major freshwater resources of the VAFB region include six streams, comprising two major and four minor drainages. The major

drainages are San Antonio Creek and the Santa Ynez River. The minor drainages include Shuman, Bear, Cañada Honda, and Jalama Creeks. Aquifers capable of yielding large quantities of water usable for water supply are generally restricted to the deeper portions of the Santa Ynez River and San Antonio Creek (USAF 1998).

The proposed VTRS realignment route would not be located within any the major or minor drainages on VAFB. The proposed route crosses an intermittent stream that was dry during the surveys completed in July 2007. Although no wetland or riparian vegetation is associated with this intermittent stream, the site would be bored to avoid any potential adverse effects.

One-hundred year floodplains have not been identified within the area of influence of the Proposed Action.

### **3.3.2 Groundwater**

The depth of the water table in the underlying Monterey shale varies in this area of VAFB from 70 to 131 feet below ground surface (VAFB 1992). Construction would not extend to these depths, as the deepest construction would occur with HDD boring at maximum depths of approximately 25 feet below the surface.



## Chapter 4. Environmental Consequences

This chapter presents the results of the analysis of potential environmental effects of implementing the Proposed Action and the No-Action Alternative as described in Chapter 2.

### 4.1 Biological Resources

#### 4.1.1 Proposed Action

The Proposed Action would potentially result in disturbance to a 10-foot wide corridor on either side of the proposed 2.9 miles VTRS realignment route. In addition an area approximately 10 feet by 20 feet would be required to install each manhole. Installation of the VTRS realignment route would last approximately 30 days. Throughout most of the route, the fiber optic cable and conduit would be installed along established trails and roads with the exception of a section approximately 3,200 feet in length which would be installed across open space (see Figure 2-2). Directional boring would be used as necessary to minimize or avoid disturbance to sensitive biological resources and cultural sites. Where not located in previously disturbed or developed areas, disturbance to existing vegetation would occur.

Site-specific measures that should minimize adverse effects on natural resources and avoid impacts to special status species are summarized in Section 2.1.5, Protection Measures.

#### Botanical Resources

Potential impacts to plant communities and plant species include:

- ▶ Short-term (temporary) and long-term (permanent) loss of habitat from construction

related activities such as access, and excavation.

- ▶ Loss of individuals within the work area due to excavation, crushing or burial.
- ▶ Loss of individuals in habitats adjacent to work areas due to soil erosion.
- ▶ Soil erosion in wetlands or open water adjacent to the project site.

Installation of the proposed fiber optic cable would occur in open space at one location (Figure 2-2). The dominant plant community at this site is non-native grassland.

#### Special Status Plant Species

**Gaviota tarplant**, occurs only in one site along the route, but outside of the project area (Figure 3-6). As an added protection measure, the site will be marked and flagged and the construction crew would be restricted from the site. No adverse effects to Gaviota tarplant are anticipated to occur.

#### Wildlife Species

Installation of the proposed VTRS realignment route would occur in October, which is past the breeding season for many terrestrial and avian species. The potential adverse effects to wildlife species associated with the Proposed Action include:

- ▶ Short-term (temporary) and long-term (permanent) loss of habitat from construction related activities such as access, and excavation.
- ▶ Loss of individuals within the work area due to excavation, crushing or burial.
- ▶ Loss of individuals in habitats adjacent to work areas due to soil erosion.
- ▶ Abandonment of roosting sites due to project related noise and associated disturbance.

- ▶ Disruption of foraging or roosting activities due to project related noise and associated disturbance.
- ▶ Soil erosion into open water adjacent to the project site.
- ▶ Degradation of water quality due to turbidity.

Wildlife, including mammals, amphibians, reptiles, and birds, present in the vicinity of the construction activities could be affected by construction noise. Wildlife response to noise can be physiological or behavioral. Physiological responses can range from mild, such as an increase in heart rate, to more damaging effects on metabolism and hormone balance. Behavioral responses to man-made noise include attraction, tolerance, and aversion. Each has the potential for negative and positive effects, which vary among species and among individuals of a particular species due to temperament, sex, age, and prior experience with noise. Responses to noise are species-specific; therefore, it is not possible to make exact predictions about hearing thresholds of a particular species based on data from another species, even those with similar hearing patterns.

### **Herpetofauna**

Reptile and amphibian hearing is poorly studied. However, reptiles and amphibians are sensitive to vibrations, which provide information about approaching predators and prey. Vibration and noise associated with construction activities could potentially cause disturbance to amphibians and reptiles. In addition, removal of vegetation would cause the loss of habitat for some species, which would have to seek alternate cover, adding to the disturbance.

These disturbances would be considered short-term and temporary and would not be considered of a magnitude to result in adverse impacts to populations within the vicinity of the project area.

### **Birds**

Potential impacts to birds from construction and human generated noise, and habitat removal, include disruption to foraging, roosting, and breeding activities. Birds would be expected to move away from the area of disturbance during construction activities. However, once activity ceases, birds would be likely to return to the area.

The MBTA provides federal protection to native avian species, their nests, eggs, and unfledged young. Construction activities associated with the proposed project would result in short-term noise disturbances, which may temporarily disrupt foraging and roosting activities of individual birds.

### **Mammals**

Potential project related impacts to mammalian species during construction activities include disruption of normal activities due to noise and ground disturbances. These impacts would be considered short-term and temporary and would not be considered of a magnitude to result in adverse impacts to populations within the vicinity of the project area.

### **Special Status Wildlife Species**

**El Segundo blue butterfly** was documented in the seacliff buckwheat present at the intersection of Honda Ridge Road and Story Road, in the northwestern section of the proposed VTRS realignment route (Figure 3-2). Because the installation would occur in the month of October, after the butterfly's flight period (June through August), no adverse effects are anticipated to adult butterflies. Adverse effects to the butterfly eggs, larvae and pupae, and to its host plant seacliff buckwheat in this area can be avoided by installing the fiber optic cable around the stands of seacliff buckwheat within the footprint of abandoned Honda Ridge Road.

The presence of seacliff buckwheat along other sections of the route (Figures 3-3 through 3-5) is indicative of the potential for this federally endangered species to also

occur. Adverse effects to the butterfly and seaciff buckwheat can be avoided by installing the fiber optic cable along the center of the road anywhere where buckwheat is present.

**Loggerhead shrikes** are widespread on VAFB. They have the potential to occur along the proposed VTRS realignment route throughout the year. Activities associated with the proposed project could result in short-term temporary disturbances that would not be considered significant.

### **Waters of the United States and Wetlands**

Impacts to jurisdictional waters of the United States and wetlands are considered significant if the project would result in a net loss of wetland area or habitat value, either through direct or indirect impacts to wetland vegetation, loss of habitat for wildlife, degradation of water quality, or alterations in hydrological function.

One intermittent stream, dry at the time of the biological surveys, was identified in the southeastern portion of the proposed realignment route (Figure 2-2). No wetland or riparian vegetation was associated with this stream. To avoid any adverse effects, HDD boring would be used to install the fiber optic cable at this site. HDD boring would also be used for installation at four other sites to avoid cumbersome ground surface. A Frac-Out Contingency Plan would be prepared and implemented at all five sites.

#### **4.1.2 No-Action Alternative**

Under the No-Action Alternative, the realignment of the VTRS fiber optic cable route would not occur, and there would be no adverse effects to biological resources.

## **4.2 Cultural Resources**

Cultural resources would be adversely affected if the proposed action would cause loss of the value or characteristics that qualify them for listing on the National Register of

Historic Places (NRHP), or if the proposed action substantially alters the natural environment or access to it in such a way that traditional cultural or religious activities are restricted. The proposed action will comply with all relevant authorities governing cultural resources, including Section 106 of the NHPA and Air Force Instruction (AFI) 32-7065. In the event that previously undocumented cultural resources are discovered during construction activities, procedures established in 36 CFR 800.13 will be followed.

### **4.2.1 Proposed Action**

The following sections discuss the consequences of implementing the Proposed Action on cultural resources within or near the VTRS realignment route project area. This discussion of environmental consequences assumes that all construction activities will be limited to the project area illustrated in Figure 2-3.

The cultural resources investigation supporting the proposed VTRS fiber optic cable realignment identified five prehistoric archaeological sites within the project's APE. All five sites have not been evaluated for eligibility for listing on the NRHP; VAFB assumed all five sites are historic properties for the purposes of this project only, and developed a strategy of avoidance. One site would be completely avoided and three sites would not be affected as long as vehicle traffic is restricted to the existing road. One site is bisected by an access road that would only be used by pick-up trucks; tracked equipment on this access road would be prohibited. Because the access road is hard packed soil and only rubber-wheeled vehicles would drive over the site at very slow speeds, no displacement of artifacts and no other types of disturbance is anticipated. Because of this, VAFB has determined that the proposed VTRS fiber-optic cable installation project would have no adverse effect upon historic properties. The California State Historic Preservation Officer concurred with VAFB's Section 106 finding in November 2007 (OHP file reference # USAF071019A).

#### **CA-SBA-623**

CA-SBA-623 is a very large site and Access Road A traverses its western end on an existing two-track jeep trail. Examination of this area turned up no cultural material at all and none was noted anywhere along the road. Previous examinations of this portion of the site found only an extremely sparse scatter of lithics. The northeastern portion of the site is within 60 meters of the cable line, but is some 14 meters lower in elevation, on a very steep slope; it will not be affected by the cable installation.

Equipment would be restricted to the existing road to avoid affecting the resource. No staging or equipment parking off the existing road would be allowed within the site boundaries.

#### **CA-SBA-625**

CA-SBA-625 is a small site on a bench around a developed spring area. No cultural material was noted during the project inspection. Very little cultural material was ever, in fact, noted on the site and construction of the spring house/cistern and other facilities has essentially destroyed it. The cable line is planned to pass below the site, on the side of the ridge approximately 30 meters away. It will have no effect on the CA-SBA-625. No staging or equipment parking would be allowed on the site.

#### **CA-SBA-627**

CA-SBA-627 is a relatively dense deposit of shell and lithics with dark stained soil on a terrace on the north side of the west branch of Cañada de los Ladrones. Cultural material was noted to be abundant over the whole terrace during the project inspection. Depth of the deposit is unknown. Both shell and lithics were noted in the road tracks and a few pieces were even noted north of the site boundary on the steep slope above it.

Access Road A crosses through the site. Tracked vehicles would avoid damaging the site by accessing through Honda Ridge Road.

No staging or off road travel would be allowed in the site vicinity.

#### **CA-SBA-2865**

CA-SBA-2865 is a very sparse scatter of cultural material on a ridge crest. The two-track road (Access Road B) passes through the west edge of the site and there is evidence that tracked vehicles have traversed the road in the past. No cultural material was noted in the road during the project inspection. Vehicle traffic would be restricted to the road and no staging or off road vehicle traffic would be allowed within the site.

#### **CA-SBA-2866**

CA-SBA-2866 is described as 11 flakes and one scraper fragment on the narrow crest of the ridge with the road (Access Road B) passing through the middle of the site. The site was revisited in 1997 for a condition assessment (Lebow and McKim 1997) and again in 2007 for the VTRS realignment route project and no cultural material was noted during either inspection. No flakes or shell were noted in the road. It appears that tracked vehicles have traversed the road in the past. Vehicles would be restricted to the existing road and no staging or other off road travel would be allowed in the site area.

### **4.2.2 No-Action Alternative**

Under the No-Action Alternative, the realignment of the VTRS fiber optic cable route would not occur, and there would be no adverse effects to cultural resources.

## **4.3 Water Resources**

Adverse impacts to water resources would occur if the Proposed Action 1) caused substantial flooding or erosion; 2) adversely affected surface water quality to creeks or rivers; or 3) adversely affected groundwater or water quality to localized water resources.

### 4.3.1 Proposed Action

The Proposed Action would be added to the CITS project NPDES Construction General Permit coverage by amending the Notice of Intent and the SWPPP, as required by Section 402 of the CWA. The total disturbed area for the CITS project would be approximately 106 acres, with the VTRS realignment route disturbing approximately 3.5 acres. The contractor would implement the SWPPP developed for the CITS project to maintain compliance with the NPDES Construction General Permit. All permit conditions and BMPs would be implemented to minimize the potential for adverse impacts to local water resources. During site preparation and construction activities, storm water/erosion BMPs would be implemented during and after any clearing, excavation, and grading. Long-term BMPs would be put in place to address storm water erosion after project completion. Spill protection measures and a Frac-Out Contingency Plan (see Appendix B), including placement of temporary berms and silt fencing, would be implemented to prevent contamination and to contain bentonite in the event of an accidental release into the environment. After cable installation, any disturbed/bare ground areas outside of established trails and unpaved roads would be revegetated with appropriate plant and seed mix. In addition, the contractor would implement all NPDES Construction General Permit requirements until the Central Coast RWQCB officially terminates the permit coverage.

A Notice of Intent was coordinated with 30 CES/CEV prior to being submitted to the SWRCB for the entirety of the CITS project. In July 2005, the SWRCB issued the contractor a Waste Discharge Identification Number for the CITS project. The contractor would also submit a Notice of Termination for the entire CITS project to the Central Coast RWQCB after coordination with 30 CES/CEV to ensure all permit termination requirements are met.

A CWA Section 401 Water Quality Certification from the Central Coast RWQCB

and CWA Section 404 Permit from the U.S. Army Corps of Engineers would not be required under the Proposed Action because no direct impacts to water bodies or wetlands would occur. There are no direct discharges from the Proposed Action into any of the CWA Section 303 (d) listed water bodies, San Antonio Creek, and Santa Ynez River on VAFB.

The contractor would implement all NPDES Construction General Permit conditions including SWPPP BMPs and inspections, the Frac-Out Contingency Plan, and the VAFB Discharge to Grade Program. With the implementation of these procedures and requirements, adverse effects to water resources would be less than significant, as described below.

### Surface Water and Floodplains

The Proposed Action would entail installation of approximately 2.9 miles of fiber optic cable, and of two new manholes. These activities were considered in the analysis of environmental consequences within the geographical water resources areas described in Chapter 3.

Proper management of materials and wastes during cable and manholes installation would reduce or eliminate the potential for contaminated runoff. The use of petroleum oil and lubricants (POLs) during installation, and of bentonite in the boring process, pose the potential for releasing pollutants and adversely affecting water resources. This potential would be greatest during the rainy season.

As required by the NPDES Construction General Permit, BMPs would be implemented to properly manage materials. Storm water or wastewater discharges that may occur during installation work at manholes would also be managed through implementation of BMPs, as required by the NPDES Construction General Permit. The Frac-out Contingency Plan and the Discharge To Grade program would also assist with the management of storm water and wastewater discharges. The NPDES Construction General Permit covers

all installation and lay down areas. Implementing BMPs as part of the NPDES Construction General Permit to reduce and/or eliminate project-associated runoff would further reduce the potential for adverse effects, especially during the rainy season. With these measures in place, adverse effects to surface water and floodplains would be less than significant.

#### **Groundwater**

The VAFB water supply primarily comes from water purchased from the California Department of Water Resources State Water Project. Four wells located in the San Antonio Creek-Barka Slough area are used to supplement the VAFB state water during annual maintenance periods. The greatest threat to groundwater is contamination from hazardous material or waste releases that could infiltrate an aquifer. The only local ground drinking water sources are the water wells located near Barka Slough, which are approximately 14 miles from the VTRS realignment route.

#### **4.3.2 No-Action Alternative**

Under the No-Action Alternative, the proposed VTRS realignment would not be installed and, no impacts to water resources would occur.

### **4.4 Cumulative Impacts**

Adverse cumulative impacts (hereinafter referred to as “cumulative impacts”) result from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions, regardless of the agency that undertakes these other actions. Cumulative impacts can result from actions whose adverse impacts are individually minor or negligible, yet, over a period of time, are collectively significant.

The proposed realignment of the VTRS route would replace five of the VTRS segments. Because the magnitude of the realignment is similar to that of the five segments that it would replace, no additional potential effects would occur and cumulative effects would not differ from those previously described in the VTRS EA (USAF 2004) and the CITS EA (USAF 2006).

To ensure that no significant cumulative impacts result from VAFB projects occurring concurrently or non-currently, VAFB includes environmental contract specifications and mitigation/protective measures as necessary in all projects. Actions are taken during the planning process to ensure adverse impacts are minimized or avoided all together as projects are reviewed under NEPA. Prior projects are also considered to ensure no levels of acceptable impacts are exceeded.

## Chapter 5. Persons and Agencies Contacted

Liz Bell, 30 CES/CEVNN Natural Resources, Vandenberg Air Force Base.  
Kenneth Domako, 30 CES/CEVP Environmental Planning, Vandenberg Air Force Base.  
Steven Galbraith, 30 CES/CEVNC Cultural Resources, Vandenberg Air Force Base.  
Kimberlee Harding, 30 CES/CEVC Air Quality, Vandenberg Air Force Base.  
Luanne Lum 30 CES/CEVNN Natural Resources, Vandenberg Air Force Base.  
Patrick Marshall, CITS Program Management, Patrick Air Force Base.  
Robert Marshall, Lead Distribution Engineer, ITS, Hanscom Air Force Base.  
Karl McDonald, 30 SCS/SCXP CITS Project Manager, Vandenberg Air Force Base.  
Craig Nathe, 30 CES/CEVR Installation Restoration Program, Vandenberg Air Force Base.  
Glen Richardson, 30 SW/JAV Environmental Attorney, Vandenberg Air Force Base.  
Dina Ryan, 30 CES/CEVPP Environmental Planning, Vandenberg Air Force Base.  
Mike Shaw, General Dynamics.  
Tara Wiskowski, 30 CES/CEVC Water Quality, Vandenberg Air Force Base.

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## Chapter 6. List of Preparers

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California Regional Water Quality Control Board, Central Coast Region, San Luis Obispo, CA  
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La Purisima Audubon Society, Lompoc, CA  
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Lompoc Public Library, Lompoc, CA  
Santa Barbara Public Library, Santa Barbara, CA  
Santa Maria Public Library, Santa Maria, CA  
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## **APPENDIX A**

### **Cultural Resources**

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## Appendix A – Cultural Resources

The following synthesis, modified from Lebow and Moratto (2005). The historical overview derives primarily from Palmer (1999).

### Prehistory

The prehistory of California's central coast spans the entire Holocene and may extend back to late Pleistocene times. In the Santa Barbara Channel region, a fluted Clovis point found on the surface of a coastal site suggests use of the area possibly as early as 11,000–12,000 years ago (Erlandson et al. 1987), while a site on San Miguel Island has yielded a radiocarbon date of 10,300 B.P. (Erlandson 1991). Recent calibrations suggest that terminal Pleistocene radiocarbon dates are about 2,000 years too recent (Fiedel 1999:95) and thus these early sites may be even older. In San Luis Obispo County, excavations at CA-SLO-2 in Diablo Canyon revealed an occupation older than 9,000 years (Greenwood 1972; Moratto 1984) and investigations at CA-SLO-1797 indicate initial occupations as early as 10,300 B.P. (Fitzgerald 2000). Occupations on Vandenberg AFB occurred by at least 9,000 years ago, based on radiocarbon dates from CA-SBA-931 (Glassow 1990, 1996) and CA-SBA-246 (Lebow et al. 2001) near the mouth of the Santa Ynez River, and from CA-SBA-530 at the mouth of Honda Canyon (Lebow et al. 2002).

Moratto (1984) refers to these early occupations as Paleocoastal. Population densities were probably low, judging from the limited number of sites dated to this period. Diagnostic tools associated with this time period have not been identified, although similarities with the San Dieguito Complex in southern California (Wallace 1978; Warren 1967) have been suggested (Erlandson 1994). Cultural assemblages have few of the grinding implements common to subsequent periods. These sites are characterized by a strong maritime orientation and an apparent reliance on shellfish. Occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994; Glassow 1996; Greenwood 1972; Moratto 1984).

Site densities throughout the central coast are higher during the subsequent periods, suggesting increased population size and possibly better site preservation. Sites dating between about 8,000 and 6,500 years ago often have relatively high densities of manos and milling slabs that are typically associated with processing seeds. These milling stones are diagnostic of this period. Shellfish appear to have continued as a dietary staple throughout the central coast (Erlandson 1994; Glassow and Wilcoxon 1988), including Vandenberg AFB (Glassow 1996; Woodman et al. 1995). However, terrestrial mammals composed a larger portion of the diet on Vandenberg AFB during this period than during any other time (Glassow 1996; Rudolph 1991). Fish were a larger part of the diet than shellfish at Morro Bay in San Luis Obispo County, although shellfish were better represented during this period than during subsequent periods (Jones et al. 1994).

Early scholars associated sites of this age with inland knolls and terraces (e.g., Rogers 1929), but subsequent investigations revealed that coastal environments were also used (e.g., Glassow et al. 1988). Well-developed middens at many sites suggest a more sedentary and stable settlement system (Breschini et al. 1983). Glassow (1990, 1996) infers that occupants of Vandenberg AFB during this time were sedentary and had begun using a collector-type (i.e., logistically mobile) land-use strategy. Burial practices suggest that society was primarily egalitarian (Glassow 1996).

Population densities appear to have decreased substantially between 6500 and 5000 B.P. throughout the region, and little is known about this period. It is possible that arid conditions associated with the Altithermal degraded the environment to the point that only low population densities were possible (Glassow 1996; Glassow and Wilcoxon 1988).

After 5000 B.P., population densities increased to pre-6500 B.P. levels as conditions became cooler and more moist. Between 5000 and 3000 B.P., mortars and pestles became increasingly common throughout the region, suggesting intensified use of acorns (Basgall 1987), although these implements may have been associated with processing pulpy roots or tubers (Glassow 1997). Along the Santa Barbara Channel coastline, use of shellfish declined as other animal foods became more important. Use of more diverse environmental settings is suggested (Erlandson 1997). On Vandenberg AFB, fish and sea mammals composed a larger part of the diet during this period. Large side-notched and stemmed projectile points became more prevalent in the archaeological record, presumably reflecting increased hunting, although Glassow (1996) suggests that proportions of terrestrial mammals do not surpass the pre-6500 B.P. levels. However, higher proportions of terrestrial mammals in archaeological assemblages are associated with this period in San Luis Obispo County. Increased logistical organization is suggested in this area (Jones et al. 1994; Jones and Waugh 1995). Proportions of obsidian (indicating exchange with other regions) increased after about 5000 B.P., particularly in San Luis Obispo County (Jones et al. 1994; Jones and Waugh 1995).

Confidence in the reconstructions of early human occupation on the Central California Coast needs to be tempered to some degree by the consideration of changes in coastline configuration over this period. Various studies (Inman 1983; Kinlan et al. 2005; Porcasi et al. 1999) suggest that sea levels were rising at a fluctuating rate during the Early Holocene from a low stand at the height of the last glaciation around 15,000–23,000 years ago. This, combined with the variations in offshore bathymetry, means that at different points in time the coastline was varying distances from where it is today. Morgan et al. (1991) note that due to the shallow sloping sea floor at the mouth of the Santa Ynez River the shoreline was probably some 5.5 kilometers west of its present position around 10,000 years ago. Off the more steeply sloping shore at the mouth of Honda Canyon, however, the distance was more like 2 kilometers around the same time (Lebow et al. 2002:3-30). This realization has significant archaeological implications. One is that a whole range of archaeological evidence dating to the Early Holocene is offshore, where it is not available for study. Another realization is that sites that are today in nearshore environments were not as close to the coastline some 4,000–10,000 years ago. The shoreline in this part of the California coast appears to have reached essentially its present configuration about 3,000–4,000 years ago.

Cultural complexity appears to have increased around 3,000–2,500 B.P. Based on mortuary data from the Santa Barbara area; King (1981, 1990) suggests a substantial change in social organization and political complexity about 3,000 years ago. According to King, high-status positions became hereditary and individuals began to accumulate wealth and control exchange systems. Arnold (1991, 1992) proposes that this evolutionary step in socioeconomic complexity occurred around 700–800 years ago. In their studies on Vandenberg AFB, Lebow et al. (2006) found changes in the archaeological data supporting King's (1981, 1990) chronology of culture change.

The period between 2,500 and 800 years ago is marked by increased cultural complexity and technological innovation. Fishing and sea mammal hunting became increasingly important, corresponding to development of the *tomol* (a plank canoe), single-piece shell fishhooks, and harpoons (Glassow 1996; King 1990). The bow and arrow also was introduced during this period (Glenn 1990, 1991). Sites in San Luis Obispo County suggest that use of terrestrial mammals remained high. Proportions of imported obsidian continued to increase during this period (Jones et al. 1994).

Arnold (1992) proposes that the complex Chumash sociopolitical system known at historic contact evolved substantially during a brief period between A.D. 1150 and 1300, which she terms the Middle/Late Transitional Period. Arnold infers that decreased marine productivity caused by elevated sea-surface temperatures resulted in subsistence stress that allowed an elite population to control critical resources, labor, and key technologies, resulting in hierarchical social organization and a monetary system. Although the issue of elevated sea-surface temperatures has been questioned (e.g., Kennett 1998) and the inference of marine degradation and subsistence stress has been challenged (e.g., Raab et al. 1995; Raab and Larson 1997), the full emergence of Chumash cultural complexity around this time is generally accepted.

On Vandenberg AFB and in the Santa Barbara Channel region, population densities reached peak levels between 700 years ago and historic contact (Glassow 1990, 1996). Higher numbers of *Olivella* shell beads reflect increased exchange between the Channel Islands, the Santa Barbara mainland, and Vandenberg AFB. Increased subsistence diversity is apparent. Although shellfish continued to be a dietary staple in the Vandenberg area, the use of fish and birds increased, proportions of secondary species in shellfish assemblages increased (Glassow 1990), and dietary expansion is evident (Lebow and Harro 1998). Correspondingly, the range and diversity of site types increased as a greater range of habitats and resources was used (Glassow 1990; Lebow and Harro 1998; Woodman et al. 1991). In San Luis Obispo County, the settlement system appears to have changed substantially after 700 B.P. as residential bases along the coast were abandoned in favor of habitation sites farther inland. Coastal sites were used to obtain resources during short-term occupations (Breschini and Haversat 1988; Greenwood 1972; Jones et al. 1994; Jones and Waugh 1995). In addition, proportions of imported obsidian decreased substantially during this period (Jones et al. 1994).

## **Ethnohistory**

People living in the Vandenberg AFB area prior to historic contact are grouped with the Purisimeño Chumash (Greenwood 1978; King 1984; Landberg 1965), one of several linguistically related members of the Chumash culture. Their social organization, traditions, cosmology, and material culture are described by Blackburn (1975), Grant (1978a, 1978b, 1978c, 1978d), Greenwood (1978), Hudson et al. (1977), Hudson and Blackburn (1982, 1985, 1986), Hudson and Underhay (1978), Johnson (1988), and Landberg (1965).

Accounts of early explorers in the Santa Barbara Channel area indicate that the Chumash people lived in large, densely populated villages with well-built structures (e.g., Bolton 1927, 1930; Engelhardt 1933; Fages 1937; Morarity and Keistman 1968; Simpson 1939; Teggart 1911; Wagner 1929). With a total Chumash-speaking population estimated at 18,500 (Cook 1976) and employing a maritime economy, the Chumash had a culture that “was as elaborate as that of any hunter-gatherer society on earth” (Moratto 1984:118). Leadership was hereditary and chiefs exercised control over more than one village, reflecting a simple chiefdom social organization. The Chumash engaged in craft specialization and maintained exchange systems (Arnold 1992; Johnson 1988).

Relatively little is known about the Chumash in the Vandenberg region. Explorers noted that villages were smaller and lacked the formal structure found in the channel area (Greenwood 1978:520). The Purisimeño Chumash at historic contact used approximately 22 villages, with populations between 30 and 200 per village (Glassow 1996:13–14). About five ethnohistoric villages are identified by King (1984:Figure 1) on Vandenberg AFB, along with another five villages in the general vicinity.

Unfortunately, early explorers paid scant attention to Chumash subsistence and settlements systems. Using ethnohistoric, ethnographic, and archaeological data, Landberg (1965) attempted to reconstruct those facets of Chumash lifeways. Chumash subsistence relied primarily on fishing,

hunting, and gathering plants (primarily acorns). In the spring, groups left their winter villages for temporary camps where they gathered grasses, roots, tubers, and bulbs. Hunting marine mammals became important during times when seals and sea lions congregated at their rookeries. Bulbs, roots, and tubers were gathered during the summer months, and seeds became important during this season as well, especially to the people north of Point Conception. Interior groups moved to the coast during the spring and summer to collect shellfish. Coastal groups returned to their villages in late summer and early fall to harvest large schooling fish such as tuna. Pine nuts were collected in the mountains during the fall months; acorns also were gathered in the late fall. Both of these resources, as well as berries collected during the late summer and early fall, were stored for use during the winter. Hunting also was important during the fall. Winter months were spent in villages, where residents relied primarily on stored foodstuffs as well as occasional fresh fish (Landberg 1965:102–104). Regional variation in subsistence strategies is evident in the ethnohistoric record (Landberg 1965:104–118); in the interior and along the northern coast of Chumash territory, marine resources were less important than acorns, seeds, and game (particularly deer).

Contact with early Euro-American explorers, beginning with the maritime voyages of Cabrillo in A.D. 1542–1543, undoubtedly had an effect on the Chumash culture. The effect may have been profound. Erlandson and Bartoy (1995, 1996) and Preston (1996) convincingly argue that Old World diseases substantially impacted Chumash populations more than 200 years before Spanish occupation began in the 1770s.

Unquestionably, drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in A.D. 1769. The first mission in Chumash territory was established in San Luis Obispo in 1772, followed in short order by San Buenaventura (1782), Santa Barbara (1786), and La Purísima Concepción, established in 1787 in the present location of Lompoc. The Santa Ynez Mission was established in 1804. Eventually, nearly the entire Chumash population was under the mission system (Grant 1978c). During the 1830s, the missions were secularized in an attempt to turn the mission centers into pueblos and make the Indians into Mexican citizens.

## History

Vandenberg AFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods (Palmer 1999). The Mission Period began with the early Spanish explorers and continued until 1820. Established in 1787, Mission La Purísima encompassed the area between Gaviota and Guadalupe. Farming and ranching were the primary economic activities at the mission, which was responsible for supplying the Santa Barbara Presidio with food supplies. The mission had 4,000 head of sheep by 1800; by 1812 they numbered 12,000 and by 1821 the count peaked at 23,546. Missionaries had the Chumash weave wool blankets for the Santa Barbara Presidio. Approximately 14,000 sheep remained when the mission closed in 1835. In addition to sheep, wheat, barley, corn, peas, and beans were grown at Mission La Purísima. Agricultural activities primarily occurred along the major streams such as San Antonio Creek and the Santa Ynez River (Palmer 1999:2).

The Rancho Period of Vandenberg AFB history began in 1820 and continued until 1845 (Palmer 1999). Following secularization in 1834, the Alta California government granted former mission lands to Mexican citizens as ranchos. The Vandenberg AFB cantonment area lies within Rancho Jesus Maria, which originally encompassed 42,184 acres and was granted to Lucas, Antonio, and Jose Olivera in 1837. Rancho Jesus Maria included lands from just south of Shuman Canyon (northern boundary) to the Santa Ynez River (southern boundary), and from the Pacific Ocean to a few kilometers east of San Antonio Terrace and Burton Mesa on the east (Tetra Tech 1988). Lucas

Olivera is thought to have constructed an adobe at the site of the Marshallia Ranch in 1837. By 1839, Antonio and Jose Olivera had sold their part of the land grant to José Valenzuela, who, in 1847, sold a one-third share to Don Pedro Carrillo and a one-third share to Lewis T. Burton. Cattle ranching was the primary economic activity during the Rancho Period; in the 1840s cattle were so abundant that only the hides had any value (Palmer 1999).

The Bear Flag Revolt and the Mexican War marked the beginning of the Anglo-Mexican Period (1845–1880). Cattle ranching continued to flourish during the early part of this period, with as many as 500,000 cattle in Santa Barbara County during the 1850s. However, severe droughts during the 1860s decimated cattle herds, and less than 5,000 cattle remained in the entire county. The combination of drought and change in government from Mexico to the United States caused substantial changes in land ownership. By 1851 non-Mexicans owned approximately 42 percent of the land grants; by 1864, after a few years of drought, 90 percent of the southern California ranchos were mortgaged. The various shares in Rancho Jesus Maria changed hands, with Lewis Burton increasing his holdings. His son, Ben Burton, inherited all of Rancho Jesus Maria upon his father's death in 1879. Sheep ranching and grain farming replaced the old rancho system during this period. Dairy farming became an important economic activity during this time, particularly as Swiss-Italians immigrated into the area. Early roads were established during the 1860s and 1870s to obtain supplies that were surfed in at Point Sal. Farming remained a limited activity, due in part to the difficulty of shipping to markets. The Lompoc Temperance Colony established Lompoc during this period (Palmer 1999).

Increased population densities characterize the Americanization Period (1880–1915). The railroad reached the area in the late 1890s and provided a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching continued and agriculture increased, particularly with development of steam-powered threshers. Row crops became increasingly common, and sugar beets were one of the most economically important commodities. Union Sugar Company had a substantial influence on economic growth in the region. Oil exploration began in earnest during this period. Union Oil began to purchase Rancho Jesus Maria property in 1903; they ultimately obtained subsurface rights to 120,000 acres in the area. Ben Burton leased the former Rancho Jesus Maria for grazing and farming during the early part of the Americanization Period. However, by 1900 the rancho was divided into four parcels and sold. These four parcels were further subdivided by 1906. Edwin Marshall formed the Jesus Maria Rancho Corporation in December of 1906; by the 1920s the Marshall Ranch encompassed 52,000 acres and prospered by raising cattle and beets. Its headquarters were constructed between 1906 and 1933 at the location of the Olivera adobe. An elaborate system of line camps and other facilities supported the ranch operations. Marshall also introduced eucalyptus trees as a potential source of commercial firewood.

Ranching and farming continued on the Marshall Ranch during the early part of The Period of Regional Culture (1915–1945). At various times, the Marshall Ranch experimented with game birds, chickens, turkeys, and purebred bulls. Grain was raised on coastal terraces, and Union Sugar purchased farm land in the San Antonio Valley from Marshall for agricultural purposes. In 1933, the Marshall family moved to the Olivera adobe and expanded and modernized the building. A wood-framed guest house was added in 1935, and a dude ranch operation began. The facility became known as the Marshallia Ranch and catered to Hollywood personalities. Visitors could arrive by airplane at an air strip in front of the house, and they could enjoy ranching activities, horseback riding, or tennis. The ranch was sold to Frank Long upon the death of Edwin Marshall in 1937. Cattle ranching and guest operations continued until the start of World War II, when the property was condemned for Camp Cooke. However, the Army allowed the Marshallia Ranch to stay open to serve Army officers. All ranching, farming, and dairy farming in the Vandenberg AFB area was substantially reduced when Camp Cooke was established in 1941. This Army training

facility was built on approximately 90,000 acres along the coast, and included the area of Rancho Jesus Maria. Camp Cooke was deactivated at the end of World War II (Palmer 1999).

In the vicinity of the project area the main Sudden Ranch headquarters expanded significantly during the 1920s, building new barns and reservoirs. The Sudden Ranch used a rotation of dairying, grazing and haying, and the built environment included hay barns corrals, developed springs, reservoirs and stock tanks, many of which are extant today. The railroad was used to ship cattle out and supplies in until the 1930s. During the war the an Army radar facility was built at Red Roof Canyon, a couple miles to the east of the project area, and just southeast of it the Sudden railroad depot was expanded and ten new structures were built (Palmer 1999:90).

The Suburban Period (1945–1965) began with the end of World War II. After Camp Cooke was deactivated, the Army continued the historic tradition and leased much of the area for ranching and farming. Oil drilling reached its peak during this period. Union Oil drilled a number of wells on the San Antonio Terrace, and the Jesus Maria No. 4 produced commercial quantities of oil. Most of the Suburban Period is characterized by military use of the area. Camp Cooke was reactivated in 1950 for training during the Korean War. It was put into caretaker status from 1953 to 1956. The cantonment area became so overgrown that sheep were used to manage the vegetation and reduce the fire hazard. In November of 1956, the Army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed the Cooke Air Force Base (Palmer 1999). In 1958 the base had its first missile launch, the Thor, and was renamed Vandenberg AFB. The southern section of the current base was transferred to the Air Force from Army and Navy control in 1964 (Vandenberg AFB 1992). Post-transfer use of both North and South Base has related primarily to the construction and operation of missile launch and support facilities. Specific activities include management of the launch, testing, and evaluation of ballistic missile and space systems for the DOD, and operation of the Western Range (Science Applications International Corporation [SAIC] 1995; Vandenberg AFB 1992).



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